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ORIGINAL ARTICLES.

DESERT THIRST AS DISEASE.

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I.—A CASE OF THIRST.

The principal scene of the case is a typical *auguaje* (i. e., "water") of southwestern Arizona, known since the days of Padre Kino (who apparently passed that way in the expedition of 1701 which proved that California is not an island, and located the "Tinaxa" on his map of 1702) as Tinajas Altas, or "high tanks." The water lies in a number of potholes or water-pockets in a gorge cleaving the northeastern side of Sierra Gila; it is chiefly a residuum of the light midsummer or mid-winter rains, though the deeper pools are partly supplied by seepage from the granite ledges and precipices rising ruggedly several hundred feet above the gorge-bottom. The locality is about 75 miles southeast of Yuma, 40 miles south of Gila River, and three or four miles north of the Mexican boundary at a point 50 miles east of the mouth of Rio Colorado. The nearest house—the Southern Pacific station at Wellton—is some 30 miles northward in an air line, over broad sandwastes with scattered *sierritas* and buttes; water is obtainable at the Fortuna mine, 35 miles northwestward in Sierra Gila, and sometimes in other water-holes in the granites seven miles southward and twenty miles eastward; the abandoned Tule Well is 23 miles eastward, and the nearest certain water in that direction is in Rio Sonoyta sandwash at Agua Salada, some 80 miles away, or Agua Dulce, ten miles further. The region was never permanently inhabited by the aborigines, though temporarily occupied by the Papago Indians at the times of the cactus-fruit harvests, and apparently by the Cocopa and Maricopa Indians as a way-station on a severe and secret route of intercommunication; and hundreds of mortars are ground into the granites about the tinajas, while other relics occur. For the two half-centuries (1750-1848) during which California was a flourishing Mexican province, Tinajas Altas was reputed the sole sure "water" between Rio Sonoyta at Santo Domingo or Quitobaquito and Rio Colorado at Yuma on that desperately hard overland route known as El Camino del Diablo, which joined the royal

roads of Sonora and Sinaloa with the easier El Camino Real along which the old missions of southern California were strung; and during the days of the Argonauts, from '49 to the middle '50s, the same route was the hardest part of the Old Yuma Trail trod by American Pioneers in their long trek to the land of gold. From the single-house settlement of Quitobaquito to the town of Yuma the way is houseless, and apparently never had a fixed habitation save a small adobe at Tule Well; yet the passage of pioneers over the desert stretches was so steady and long-continued that hardly a mile of the 200 from Santo Domingo to Yuma remains unmarked by one or more cruciform stone-heaps attesting death by the wayside; death commonly in its cruelest form—by the torture of thirst. Most of the movement was westward, and the worst reach lay between Tule Well and Tinajas Altas; along this way the cross-shape stone-heaps, each telling its mute tale of tragedy, thicken until within gunshot of the nearly perennial water, where are over 60 marked graves—and how many unmarked none know—lie mostly on a single little mesa in plain sight of the pools; for again and again exhausted strugglers fell at the foot of the gentle up-slope, or failed to find water in the lowest pool and were unable to climb the rocks to the higher reservoirs: when, if the next followers were pious folk—as were most of the Mexican pioneers,—the stark bodies were laid in shallow graves laboriously sealed with the sign of the cross.

Such was the site of my camp from May 20 to August 28, 1905—a tentless camp, with a living population of one when Papago Jose was gone for a week or less at a time, of two when either he or the young histrion Harrison Ford was present (during the few weeks of his stay), and three with both; or of half a dozen for a few hours at a time when, as happened twice or thrice, prospecting parties passed that way: a camp devoted to meteorologic observation and study of the effects of light on desert life.

Just before noon of Monday, August 14, Pablo Valencia and Jesus Rios drifted into camp horseback en route to the "lost mines" rediscovered by the former some months before. They were supplied with pinole (parched-wheat meal), bread, cheese, sugar, coffee, and tobacco for a week's subsistence, with two 2-gallon and two 1-gallon canteens, and had also a dozen pounds of pressed alfalfa and twice as much rolled barley for the horses.² Jesus is 65, a former vaquero and nearly

² They were outfitted at Yuma by Jim Tucker, miner and rancher; they left there in the saddle after noon on August 12, having shipped a bale of hay and a bag of barley with some of their food and canteens to Wellton; camping on the banks of the Gila north of Blaisdell, they started early Sunday morning and reached Wellton about midafternoon, where they took their freight and fed and watered freely, leaving part of the feed for the return. They started for Tinajas Altas Monday morning "at the time of the morning star" (say three o'clock) and covered the thirty-odd miles in a little over eight hours.

typical Mexican, claiming familiarity with the country, but erratic and inconsequent and little dependable in statements of fact or in any other way; he rode his own grass-fed horse, which shrank, bronco-like, from barley. Pablo is about 40, of remarkably fine and vigorous physique—indeed, one of the best-built Mexicans known to me. In earlier life he was a sailor on Pacific vessels and afterward a wandering prospector and miner; he was tiding over the summer of 1905 by growing watermelons on a ranchita near Gila City. He measures about 5 feet 7 inches, weighs normally some 155 pounds, and is notably deep-chested and round-bodied, with—for a Mexican—exceptionally robust limbs; he is reputed a large eater and heavy sleeper, and is of phlegmatic disposition, given to drowsing in the shade rather than working in the sun—yet between periods of repose he is of energetic and pertinacious habit, walking barefoot or in sandals (in preference to riding) with a quick and strong up-springing gait carrying him by all but the best horses, openly scorning hunger and thirst and boasting ability to withstand far beyond ordinary men these habitual inconveniences of the range. In a word, he is a particularly fine type of the animal genus *Homo*—a most matter-of-fact man of action in his little world, albeit lightly burdened with acute sensibility, imagination, or other mentality; indeed, an ideal man to endure stressful experience. He rode Jim Tucker's best horse—an animal of exceptional bottom, well inured to desert work.

While their horses ate, Pablo and Jesus lunched with Jose and me, feasting on jerked cimarron (mountain-sheep meat), in addition to their own comestibles. Against my advice (which was to leave at 1 A. M. Tuesday, the moon being about the full), they set out for their El Dorado about five o'clock; but in half an hour they returned, having decided to wait until morning on the ostensible ground that the horses had drank but little, though in reality because my judgment had finally worked in. Next morning Jose stirred up Jesus, and the two pulled Pablo from his saddle-blanket for breakfast; and they got off at daylight. This was the real beginning of the journey—about 3:45 Tuesday morning, August 15.

Soon after midnight Jesus came in alone, with both horses, reporting that Pablo had sent him back from a point about 35 miles south-eastward to re-water, he himself going forward on foot with a 2-gallon canteen and a stock of pinole, under an agreement—an inane if not insane one in desert life—to rendezvous 24 to 30 hours later not on the trail but on the farther side of a nearby sierra. Jesus drank, ate, watered, fed, and struck the trail again (with five gallons of water, taking one of my canteens) about 3:30 A. M. on the 16th. Next morning about 7 he again came in alone with both horses, reporting that his own animal had broken down after a short distance and that he had

ridden the Tucker horse by a better route both to the rendezvous and to where he had left Pablo at the edge of the sand-hills; and that he had been unable to find either the lost man or his trail. He explained that Pablo had probably gone on to Agua Salada (as he had advised all along, misstating the distance, etc.), and proposed after resting to return to Wellton and Yuma. He was indeed exhausted, having ridden some 150 miles in about 52 consecutive hours; while his horse was practically broken down, and the Tucker animal tired. On putting together all statements from both Pablo and Jesus, I was in doubt as to whether or not Pablo had gone on toward Rio Sonoyta, though this seemed probable; yet I thought he ought to have another chance for his life, and so held Jesus at Tinajas Altas and sent Jose (an expert trailer among his tribe of trailers) out on the Tucker horse to find Pablo's track, giving him full instructions as to routes, places for smoke signals, etc. (for I knew the region better than he), and directing him to go to the limit of his horse's endurance and then to his own limit beyond. Jose carried a feed of barley, a couple of pounds of pinole and dates for himself, and two extra canteens; he got off about 10 o'clock Thursday, August 17. Stopping only to send up smokes, he followed old Jesus' ill-chosen trails and easily located the point at which Pablo had left him on the 15th; thence he followed the foot-trail with difficulty in the darkness of the early night. Reaching the sand-hills about moonrise, he left the horse and labored through the dunes seven miles further—then returned as he came, making signal fires here and there. Picking up the horse in the dawn and giving him a half-gallon of water from his hat, he arrived at camp in speechless exhaustion just before noon Friday, the 18th. I was convinced that further effort would be bootless, since it seemed probable that even if Pablo had not gone on to Agua Salada en route to Santo Domingo he could hardly still survive, for he had already been out over three days with only one day's water—and most of those who die from desert thirst expire in less time; so although Jesus and his horse were still unrestored and the Tucker animal had been moving almost steadily for 80 hours and over 225 miles, I packed Jesus off toward Wellton and Yuma to report his virtual abandonment of the man he had undertaken to guide and protect—supplementing his prospective oral report with a special delivery letter to El Padron (Jim Tucker), to be mailed at Wellton in time for the 2 o'clock train Saturday morning.³

So ended the first episode in the Pablo Valencia event, in the after-

³ Jesus started about four o'clock P. M. on August 18 and should have reached Wellton between one and two, thus getting the letter into Tucker's hands early the next morning, and he should have himself arrived in Yuma early Sunday morning, August 20; but he slumped characteristically on the Wellton stretch, and made a needless camp beyond, so that he and the letter arrived about the same time on Monday afternoon.

noon of August 18. I remained uneasy a day or two longer, and next day and the day after climbed a neighboring peak 750 feet high and walked out a few miles on the trail to seek for sign; then Jose and I fell into normal camp routine.

In the graying dawn of Wednesday, August 23, the grasp of sleep on me relaxed in a vivid dream recalling a picture often presented in the ganaderos (half-wild cattle ranges) of western Sonora—the picture of an orderly file of stock, led by a stalwart bull and trailing down to yearlings in the rear, the leader iterating his grave grumbling roar of assurance to the herd which at last—as on the range—rose in quick crescendo into the ear-piercing bellow of challenge and defiance to all other kine. I awoke at the dream-sound to realize its actuality, and turned my head half expecting to see the herd; instead, there stood Jose, just arisen from his blanket, looking down the arroyo. Seeing my movement, he asked: "What is it? I thought it was one of them roaring, lions, like in the Zoo." Now fully awake, I replied: "It must be Pablo; take the canteen." Though wholly incredulous, he mechanically seized a canteen and a strip of manta which with his coat made a pillow, and, after a call in reply, ran down the trail. I soon followed, carrying another canteen and a medicine case; and on the arroyo sands, under an ironwood tree, at the foot of the Mesita de los Muertos with its two-score cross-marked graves, came on the wreck of Pablo, with Jose already ministering unto him.

Pablo was stark naked; his formerly full-muscled legs and arms were shrunken and scrawny; his ribs ridged out like those of a starveling horse; his habitually plethoric abdomen was drawn in almost against his vertebral column; his lips had disappeared as if amputated, leaving low edges of blackened tissue; his teeth and gums projected like those of a skinned animal, but the flesh was black and dry as a hank of jerky; his nose was withered and shrunken to half its length, the nostril-lining showing black; his eyes were set in a winkless stare, with surrounding skin so contracted as to expose the conjunctiva, itself black as the gums; his face was dark as a negro, and his skin generally turned a ghastly purplish yet ashen gray, with great livid blotches and streaks; his lower legs and feet, with forearms and hands, were torn and scratched by contact with thorns and sharp rocks, yet even the freshest cuts were as so many scratches in dry leather, without trace of blood or serum; his joints and bones stood out like those of a wasted sickling, though the skin clung to them in a way suggesting shrunken rawhide used in repairing a broken wheel. From inspection and handling, I estimated his weight at 115 to 120 pounds. We soon found him deaf to all but loud sounds, and so blind as to distinguish nothing save light and dark. The mucus membrane lining mouth and throat was shriveled,

cracked, and blackened, and his tongue shrunken to a mere bunch of black integument. His respiration was slow, spasmodic, and accompanied by a deep guttural moaning or roaring—the sound that had awakened us a quarter of a mile away.⁴ His extremities were cold as the surrounding air; no pulsation could be detected at wrists, and there was apparently little if any circulation beyond the knees and elbows; the heartbeat was slow, irregular, fluttering, and almost ceasing in the longer intervals between the stertorous breathings.

The victim was, of course, unable to articulate or to swallow. Water was slushed over his face, head, chest, and abdomen, and rubbed into his limbs and extremities, the skin first shedding and then absorbing it greedily as a dry sponge—or more exactly, as this-season's rawhide; dilute whiskey was forced into his mouth and rubbed on his chest with prompt effect (doubtless the greater because Pablo was a habitual teetotaler); and when in half an hour swallowing motions began feebly, both whiskey and a powerful heart stimulant (digitalis-nitroglycerin-belladonna tabloid triturates) were administered internally. In an hour he drank, though most of the water was immediately expelled from the stomach; in two hours he began to partake of food—a bird fricassee with rice and shredded bacon; in some three hours (soon after sunrise) he was able with some help to walk into camp. By this time he had ingested and retained about $2\frac{1}{2}$ ounces of whisky, with 5 ounces of water, and 2 or 3 ounces of food; his external tissues were saturated and softened, circulation was restored sluggishly in his extremities, and his numerous wounds begun to inflame or exude blood and serum. Articulation slowly returned, and in a cracked voice, breaking involuntarily from bass to falsetto, he began to beg pathetically for “agua, agua,” and to protest against the “dust” which we were compelling him to sip; he even failed to recognize coffee, which was given in small quantities.

As Pablo's strength returned in the course of the day, two abnormal conditions developed: the more disturbing at the outset began with local inflammation about the cuts, scratches and bruises suffered in creeping the last seven miles over a cactus-dotted and often stony plain, and extended into a general feverish and irritable state doubtless intensified by the long-continued nerve-strain; it was accompanied by pains and inflammation in wrists and hands, feet and ankles, and at one stage I feared loss of nails and sloughing of phalanges, which might have ensued in a less pure and invigorating air. The other disturbing condition was the passing of the hoarse, stertorous breathing into a sort

⁴ The distance to which the moaning carried was doubtless due partly to the funnel-shape gorge in which the sound was concentrated, while the audibility was, of course, enhanced by our habitude to the desert stillness, seldom broken save by chattering of ravens, cooing of pigeons, or whistling of quails, all beginning later in the day.

of spasm, apparently affecting stomach, diaphragm, intercostal muscles, and the upper part of the body generally—a combined retching and hiccoughing so severe as to rack the victim from head to foot and induce violent vomiting. A preparation of bismuth in tablets gave some relief, and pepsin-pancreatin tablets taken with food were beneficial; yet the spasms were so severe and persistent as to threaten fatal exhaustion. Toward evening urinary excretion began feebly, at first accompanied by blood and mucus; it was over two days before movement of the bowels began. The camp dietary was then reduced, but the birds (California quail and Sonora pigeons, shot fresh every morning) fricasseed with rice and minced bacon were nutritious and easily digested: though we longed for watermelon for him. On the third day (Saturday, August 26) vision and audition became normal, and Pablo began to notice things in an infantile way, as if the power of apperception were awakening; he stared at and evidently recognized shrubs and rocks about the camp, scrutinized and curiously felt of his own hands and feet, and also clearly recognized water; while his mind began to place Jose and me in his fabric of definite cognition—for we had been mere shadow-objects before. He surprisedly examined his wounds, which were then healing satisfactorily, and described the spasmodic retching as due to the forming of a “ball” in his stomach. On the second day he had muttered, half to himself, the events of his journey; on the third, he recounted them spontaneously and in reply to inquiries in such manner as to yield a definite and doubtless fairly trustworthy itinerary.

On Sunday, August 27, came in Jim Tucker with four-horse wagon and extra saddle animals, accompanied by two or three men (all friends of Pablo) to search for trails and remains; at first the patient hardly knew them, and shrank from them as creatures of a nightmare; but they showered him with attentions and forced on him heaping plates of stew, frijoles, fried bacon, and whole loaves of soggy Dutch-oven bread, with the result that the spasms were intensified and accompanied by effusions of biliary matter streaked with blood. For a day Tucker planned going on to the “lost mine,” leaving Pablo with me; but the relapse was so serious and the recurrent spasms so severe that by Monday noon I felt compelled to prescribe a return to Wellton. About 4 o'clock the spasm-racked wreck was bedded in the wagon; about 11 p. m., when a halt was made to rest the team—for the nearly trackless sands dragged heavily—I judged there was an equal chance of getting the patient alive to Wellton; at 2 we were moving again, and about 7 we drew into the clean sand-wash in the rear of the station. Twenty minutes later we had raw eggs, and Pablo's crisis was past. Later in the day some watermelons were secured; and next morning we were in Yuma. Pablo was guarded for a few hours, but spent practically the whole of August 31

deliberately and methodically devouring watermelons, with occasional lapses into slumber; and in a week he was well and cheerful, weighing 135 pounds or more—though his stiff and bristly hair, which had hardly a streak of gray a fortnight before, had lost half its mass and turned iron-gray.

The nature of the case and the severity of the stress successfully encountered by Pablo Valencia cannot fully be understood without considering the utterly desert character of the region—than which there is none worse in North America save Death Valley and a few other basins not opening toward the sea,—and the torridity of the climate and season. The 100-day record (May 21 to August 28) of temperature and humidity at Tinajas Altas served to define a vapor-zone about Gulf of California in which a large part of our storm-centers find origin; and although most of Pablo's route lay outside this zone and in a hotter and drier belt, the record from the evening of August 14 to the morning of August 23 approximately indicates the attendant climatal conditions. This record, with the means for the 9-day period and also the averages for both August 1-28 and for the 100-day period, is appended—from which it will appear that Pablo was favored by exceptionally low temperature and high humidity; yet the maximum temperatures ranged from 88.5 to 103.2 (averaging 95), and the minimum night temperatures from 78.4 to 93.2 (averaging 84.2), i. e., were always above that somewhat variable yet most important physiologic value which may be termed the *perspiration-point*: the point at which the burden of elimination is transferred either from kidneys and lymphatics to the skin, or from the epidermal to the internal eliminative structures, as the temperature-measure is passed. Pablo was also exceptionally favored by clouds; for although the sky was never wholly overcast, the average of morning and evening cloudiness reached two-tenths of the total sky. He was fortunate, too, in the high relative humidity for a desert range; at Tinajas Altas the percentage of aqueous vapor ranged from 18 to over 60 (averaging 38), indicating that along his route it probably oscillated between 15 and 55.

Pablo's itinerary, taken partly from his nearly meaningless maunderings as speech returned, but chiefly from connected statements largely in reply to inquiries, runs thus:

Tuesday, August 15: Left Tinajas Altas at 3:45, horseback, with Jesus; rode some 35 miles, reaching "sand-hills" about one o'clock; thence afoot with 2-gallon canteen (full at starting), pinole, tobacco, serape, duck coat, prospector's hammer, canvas specimen-bag, cigarette papers, and matches, faring some ten miles through the sands before stopping to sleep. Drank three or four times, and took pinole twice.

TEMPERATURE AND MOISTURE.

DATES	TEMPERATURE						MOISTURE			
	SELF-REGISTERING THERMOMETERS			PSYCHROMETER			HUMIDITY		Rain (in.)	Cloudiness (tenths of sky)
	Maximum	Minimum	Range	Mean	Dry bulb	Wet bulb	Depres'n	Dew point		
August 14. 8 p. m.	99°1	85°1	14°0	92°1	91°0	65°0	26°0	48°0	0	0.1—
“ 15. 8 a. m.	91.8	76.8	13	85.3	90.5	62.5	28	41	0	.1—
“ 8 p. m.	98.9	90.9	8	94.9	92	66.5	25.5	51	0	.1—
“ 16. 8 a. m.	92	81	11	86.5	86	69	17	60	0	.2—
“ 8 p. m.	99.5	85	14.5	92.2	91.5	71.5	20	61.5	0	.1—
“ 17. 8 a. m.	94	79.7	14.3	86.8	93	68	25	54	0	.1—
“ 8 p. m.	103.2	93.2	10	98.2	95	69	26	54	0	.1—
“ 18. 8 a. m.	95	83	12	89	87	76	11	72	0	.1—
“ 8 p. m.	96	86.6	9.4	91.3	88.5	73	15.5	66	0	.8—
“ 19. 8 a. m.	88.5	80.5	8	84.5	87	74	13	69	0	.1—
“ 8 p. m.	98.4	85.4	13	91.9	90	73	17	65	0	.0—
“ 20. 8 a. m.	90	81	9	85.5	87.5	73	14.5	66.5	0	.1—
“ 8 p. m.	99.1	87.3	11.8	93.2	89	71.5	17.5	63	0	.1—
“ 21. 8 a. m.	89.9	78.4	11.5	84.2	88	74	14	68	0	.6—
“ 8 p. m.	91	87	4	89	90	71	19	62	0	.6—
“ 22. 8 a. m.	92.1	81	11.1	86.7	91	69	22	57	0	.2—
“ 8 p. m.	100	90	10	95	91	71	20	61	0	.7—
“ 23. 8 a. m.	91.8	82.1	9.7	86.9	91	69	22	57	0	.2—
Means, August 14-23...	95	84.2	10.8	89.6	89.9	70.3	19.6	59.8	0	.2—
Average August 1-28...	101.8	81.7	20.1	91.7	92.3	69.7	22.6	56	.004	.12—
Average 100-day period	99.3	77	22.3	88.2	88.9	64.5		46.5	.0012	.067—

DESERT THIRST AS DISEASE.

Wednesday, August 16: Starting with the rise of the morning-star, reached the ledge of which he was in quest about midforenoon; after collecting specimens, erected monuments and posted notices for a mineral claim, finishing this work before midday. Ate a little pinole and drank sparingly (as he had done before starting), for the canteen was nearly empty. Starting northward, began search for a road described (falsely) by Jesus, and straggled rather aimlessly over the sands, moistening his mouth occasionally but not swallowing water, until the canteen was empty; at nightfall reached an arroyo in which he fancied signs of water. In the darkness of the early night (before moonrise) abandoned his nuggets, and soon after threw away his stock of pinole and his coat and serape. Failing to find water, he sought sleep in the sands; and when awakened by mouth-dryness obtained some relief—after the fashion of all Mexicans and most Americans in like cases—by occasionally filling his mouth and gargling his throat with urine.

Thursday, August 17: Set out early, seeking trails and tinajas, and working northward; unable to withstand the heat of midday, he lay down in an arroyo and ate calabasitas (wild gourds of intense bitterness), which his stomach rejected. Arising as the sun declined, he threw away shoes and trousers (with money, knife, and tobacco in the pockets), and wandered on northward, finding occasionally old trails which either faded away in a few miles or else led into sands or impassable rocks—trails mostly figments of disordered fancy. One led to an immense tinaja; but it was dry. During the day he had frequent recourse to urine, though he nearly lost the power to swallow; during the night he saved every drop of the excretion in the canteen, which he still carried.

Friday, August 18: In early morning he walked a few miles, but was overcome by the torrid heat and crept under the shade of a paloverde overhanging an arroyo; toward evening he arose, and chewed paloverde twigs with little effect save to irritate mouth and throat. Setting out northward before sunset he found a mescal (a variety of agave) and chewed the stipes, extracting a little moisture; at sunset he caught a few flies and spiders, which he chewed and tried to swallow. Still he wandered northwardly, having in mind first the rendezvous with Jesus, then the Old Yuma Trail he had traversed years before. Toward morning he became convinced that Jesus had deliberately misled and abandoned him with murderous intent in the plan of thus securing his El Dorado; and his wrath spurred him on with the aim of knifing his deceiver—a potent incentive which carried him miles and doubtless saved his life. He continued to relieve mouth-thirst with urine.

Saturday, August 19: In early morning he found mule-wagon tracks and recognized the Old Yuma Trail,⁵ which he followed, but

⁵ Here I first locate him. Apparently he was then just west of Tule Playa and east of the adjacent sandhill-malpais ridge—i. e., about 27 miles east of Tule well and 50 miles from Tinajas Altas. This trail coincides closely with the International Boundary; Colonel D. Du B. Gaillard gave a good account of it in the *Cosmopolitan Magazine* (October, 1896, pages 592-603) about the time the last Boundary Survey was completed; and I described it, with illus-

soon fell under the heat and lay all day in an arroyo. In the afternoon he saw one of the large light-green scorpions of the region; it looked luscious, and he captured it, ground off its sting with a stone, and devoured it. As before he used urine, swallowing a part with great difficulty. Toward evening he resumed journeying northward, often falling; near morning he found (or thought he found) Jesus' trail where he had wandered in search of the hopeless rendezvous set for the 16th. Throughout the night he caught occasional glimpses of a coyote trailing him. During all of Saturday and throughout this night on the trail he was buoyed by a new incentive—the hope of reaching Tule Well and casting himself into the moist mud at its bottom and at the worst dying in the dampness and coolness 37 feet below ground; he felt the notion half insane and the hope wholly hopeless, yet unto them he clung as to an inspiration. Meantime, he constantly sought insects to chew, and continued using his urine, now “mucho malo” (very bad).

Sunday, August 20: In early morning he pushed on westward, often sitting down, sometimes falling, and tried crawling—with little success. His vision was vague; the mountains danced, and the cactus and chapparal clumps moved to and fro before his eyes; and before full day he passed the first Tule Well guidepost unseen (Tule Well is a mile or two north of the main line of the trail) and kept on westward to the second one, west of the well—where the sun was growing strong, and he was too weak to work back along the side trail. Regarding his passing of the well as an omen of speedy relief, he hung his hat on the guidepost, and, after creeping to one or two tinajas—known to him of old—which he found dry, he lay all day in the shade of the rocks, utilizing every drop of urine, which now dripped scantily and involuntarily. Toward evening he again bethought himself of Jesus and the pleasure of knifing him, and was inspired to further effort; but he fell so often as he struggled forward that he was only at a remembered camp-site $3\frac{1}{2}$ miles west of Tule Well when day broke again.

Monday, August 21: On reaching at dawn the camp-site, only 19 miles from Tinajas Altas, he felt sure of relief and stretched himself across the trail so as not to be missed by rescuers—there he dozed and slept, starting up frequently at fancied sounds of wheels and hoofs; the buzzards, which had followed him for two days, now came almost within hand-reach. The sleep and coolness (only 91 degrees) of the day and the short distance traversed the night before had their effect; he felt stronger, and toward sunset he set out again westward along the trail, buoyed by the certainty of at least finding full canteens (of which Jesus had indeed left two, at impossible places). The course was down grade, along the arroyo and across the black malpais mesita on which the ancient graves lie thick; and his hope was strong, though the mountains were no longer seen in their places and he had to feel the trail with his hands every few yards

trations of Tinajas Altas and the graves on the neighboring mesita, in “The Old Yuma Trail,” *National Geographic Magazine*, Volume XII, 1901, pages 103-107, 129-143.

to be sure he went aright. He often thought he saw Tinajas Altas with abundant water and food just before him, yet was not wholly cast down on feeling a landmark he knew to be miles away; so he made, with many rests and naps, twelve miles.

Tuesday, August 22: In early dawn his mind was reaching out buoyantly to Tinajas Altas as but a few steps away, when he half saw, and then fully felt all over, the six-mile guidepost (about seven miles from camp), and awoke to the sad certainty that no canteen hung there, and the still more crushing realization that he could not cover the remaining miles of sand—for his urine had ceased to flow hours before, and he felt his last recourse gone.⁶ As the sun rose he sought the shade of a shrub and there knelt in final prayer for the dying; then he laid himself down with feet and face to the eastward, made the sign of the cross with a pang over the absence of consecrated water, and composed himself for the end. There—and this was his clearest concept, unreal though it be—with the rising of the sun he died, and his body lay lifeless under the burning rays, though his innermost self hovered about, loth to leave the material husk about which the buzzards waited patiently. The sun swung across the shimmering vault, and darkness fell; in the chill of evening (fortunately an exceptionally cool night—just above 82 degrees) some vague shadow external to his Ego stirred and then struggled aimlessly against chapparal and cactus along the most trying stretch of El Camino del Diablo. Sometimes he felt half alive and wrung by agony of severing spirit and flesh; oftener he felt that the naked body was pushed and dragged and belabored and tortured by something outside; he knew its voice tried to ery out in protest or call for rescue, but did not feel the voice his own. So the night dragged on and on, until at early dawn the vague consciousness knew itself near the camp with the certainty of relief, and was dimly surprised at the bellowing break in a final call.

Wednesday, August 23: After uttering this call, he crawled some 50 yards down the last descent to the arroyo below the Mesa of the Forty Graves. Of this day, with its physical shock and psychical break, Pablo remembered nothing clearly.

Summarily: Pablo was in the desert just eight days (and nights), with one day's water; he rode in the saddle 35 miles and walked or crept between 100 and 150 miles. For nearly seven days, or fully 160 consecutive hours, he was wholly without water from sources exterior to his system, save the few drops extracted from the scorpion, agave stipes, and insects—a desert record without parallel known to me: for half the victims of desert thirst die within 36 hours of deprivation, another quarter within 48 or 50 hours, and nearly all known to survivors

⁶ Pablo thought he left at the six-mile guidepost his hat and underclothes, though they were not found on subsequent search; it is more probable they were left at the western Tule Well guidepost, where he remembered hanging his hat as a signal. His trail here showed that he seldom walked, and then but for a few steps, only to fall again, and mostly crept wanderingly amid the thorny clumps, though sticking fairly to the trail.

within 70 to 80 hours (three days and nights), or hardly half of Pablo's stress. For some five days (August 16-21) he consumed his urine; ordinarily, the reconversion of excreted liquid is hardly helpful if not wholly harmful, yet in Pablo's case it seems to have materially prolonged vitality. For nearly nine days (August 17-26) his bowels were inactive, and for two days his kidneys failed to function. The eight-day siege lost him 35 or 40 pounds (or 25 per cent.) of his weight, chiefly through evaporation from skin and membrane; he also suffered fully two-score cuts, scratches, and bruises, each of sufficient severity to give some shock to the system; and his mouth, esophagus, and stomach were seriously deranged by his desperate efforts to relieve the thirst-torture. The most striking feature of the case was the absence of wholly insane delirium; he was, indeed, affected by the revulsion against gold, as shown by the abandonment of his nuggets and the casting away of his money; he was possessed of hallucinations as to the wetness of sands, the moisture of articulates and shrubs, and the nearness of Tinajas Altas; he was obsessed by the desire for vengeance against Jesus, the dream of casting himself in Tule Well, and the delusion of death—yet he never lost his trail-sense, and apparently squandered little vitality in those aimless movements that commonly hasten and harden the end of the thirst-victim.

II.—THIRST IN GENERAL.

In viewing thirst as a pathologic condition, it is needful to review the role of water in normal physiology. The average human body is about one-fifth solid matter and four-fifths liquid, i. e., H_2O or water. This liquid forms the chief distributing or circulating agency of the organism; it is no less essential to assimilation and metabolism than to circulation in the artero-venous and lymphatic systems; it forms the bulk of the softer tissues and enters into the composition of the harder, and permeates or flows through all structures either by osmosis or through specialized vessels. As an agency connecting the individual with the external, i. e., with environment, water is far more important than "food," more important even than air; water streams through the entire organism, entering chiefly through the alimentary system and escaping through the skin and membranes as well as through the main excretory channels; water as liquid and vapor in connection with the lungs and skin affords the chief means of equalizing and controlling the temperature required for organic existence; and water is undoubtedly the primary requisite for that ionization to which it is customary of late to reduce the chemistry of vital existence and growth. It is in harmony with the essential and distinctive role of water in the normal organism that the average human dietary embraces 4 to 12 (averaging about 6) parts of liquid to one part of solid matter—a mean ration for adults of, say,

six pounds of liquid and one pound of dry food; it is in harmony, too, with the demonstrations of Dr. Tanner and others that with water a fast of forty days is feasible but without liquid is fatal in far less time: indeed, water is to be regarded not so much a mere solvent of food-matter as an actual aliment—and by far the most important aliment in the animal economy.⁷ Accordingly, in this view of the role of water in the normal body, thirst, in extreme stages at least, is seen to constitute and express a general and fundamental derangement of the vital system.

It may be convenient to define three types of thirst, i. e., (1) the Ordinary Thirst, experienced in humid lands, caves, mines, etc., in which the air is charged with aqueous vapor and the tissues little affected by salts external to the system; (2) the Thirst of the Sea, experienced where the air is heavily charged with vapor and non-potable liquid abounds, while the tissues are subjected to the action of salts; and (3) the Desert Thirst experienced where water is lacking both as liquid and as vapor, and where free salts external to the system are (commonly) absent. The third of these types is, of course, the most distinctive; and it is this alone which I have had opportunity to study in sufficient detail to warrant discussion. My data embrace personal observation on a score or more of thirsty men at divers times and in sundry places; reminiscences gathered personally from a dozen or more survivors of extreme thirst, and from a considerably larger number of men who have chanced to succor the thirsty; portions of the abounding thirst-lore in the arid districts of Arizona, California, Nevada, New Mexico, and Sonora; numerous newspaper and magazine accounts—all more or less pointless and inaccurate; a few unwittingly faithful records like that of Manley in "Death Valley in '49"; conferences with men like artist Lungren, naturalist Merriam, litterateur Lummis, et al., who have both seen and felt; and—safest of all—several personal experiences, one extending over half way through the successive stages.⁸

It is convenient to recognize five phases of desert thirst, falling into

⁷ The role of water in the human system and its place among food-substances are discussed more fully in "Potable Waters of Eastern United States," Fourteenth Annual Report of the U. S. Geological Survey (1894), pages 5-8; and incidentally in "The Seri Indians," Seventeenth Annual Report of the Bureau of American Ethnology (1898), pages 180-182. The reckoning of ratios of solids to liquids both in body and in food varies with modes of analysis, the interpretation of hydrates, etc., so that the values given above are to be regarded as illustrative and merely approximate rather than definitely quantitative.

⁸ A considerable part of the data were summarized in 1898 in an article entitled "Thirst in the Desert" in the *Atlantic Monthly* (Volume LXXXI, pages 483-488), originally designed as a contribution to the physiology of thirst to be presented before the Medical Society of the District of Columbia (in recognition of the honor of election as a "Member by Invitation"), and only through chance diverted to a purely literary medium; the quoted extracts beyond are from this paper.

three successive stages; the first phase and stage may be considered *normal*, while the remaining stages, each comprising two phases, are distinctively abnormal or *pathologic*—the earlier being marked by *functional derangement* and the later by *structural degeneration*. The phases ensue in fixed order though the rate of progress is variable, ranging—according to heat, air-dryness, stress of exercise, and (more than all else) inurement of the sufferer to desert life—from, say, six hours to several days; while certain features of the later phases may be more or less masked when the progress is retarded either by favorable physical conditions or by special fitness of the organism.

1. *The Stage of Normal Dryness.*—*a.* The normal system deprived of water reacts mechanically with a sensation of dryness in mouth and throat, and instinctively in the general craving for liquid denoted as thirst; in conditions of extreme aridity and heat the sensation of dryness and the instinct of thirst frequently arise without actual deprivation in persons not inured to desert life. If not relieved, the initial condition passes into general uneasiness, discomfort, or irritation, accompanied by rise of temperature and other febrile symptoms. Commonly the condition is alleviated by a moderate quantity of water; sometimes fruit acids and other sapid substances exciting flow of saliva are requisite for relief; and in the practical life of the range a pebble or nail carried in the mouth is often efficacious. This stage—and phase—may be of little consequence save as the beginning of a series; it is experienced again and again by all men of arid regions, and excites annoyance rather than apprehension on the part of the patient, hilarity rather than pity among the company—it is the *clamorous* phase, or the stage of complaining.

2. *The Stage of Functional Derangement.*—*b.* In the incipient phase of pathologic dryness a general febrile condition becomes marked and is accompanied by special local symptoms; saliva and mucus in mouth, throat, and nostrils become scant and sticky, and there is a feeling of dry deadness of membranes extending to the epiglottis and even into the lungs—the sensation of inbreathed air changing from one of refreshing coolness (the chief physical pleasure of life in the desert) to one of oven-like heat; the tongue may cling irritatingly to the teeth, or stick to the roof of the mouth; a lump seems to rise in the throat and starts endless swallowing motions to dislodge it; discomfort and pain run from throat to ears along the eustachian tubes and through the tissues; the tympana may snap and drum annoyingly, while the ear-openings itch and the eyes smart. There is a feeling of fullness in face and head (doubtless due to shrinking of the skin), usually accompanied by headache and throbbing pains in the nape and down the upper spine; the hearing is disturbed and seeing capricious, so that illusions and hallucinations—especially the delectable pictures engendered by the desert mirage—spring constantly unless checked by connected effort; irasci-

bility arises, and companions quarrel and separate, perhaps to reunite for the very satisfaction of further dispute; the solitary sufferer may soliloquize, largely in impassioned invective—though the voice becomes cracked, husky or hoarse, and given to unexpected breaking into high tenor or dropping into an absurd whisper. The intellections are insensibly distorted more and more as the phase advances; prejudices are intensified, unreasoned revulsions arise against persons and things, while water and wetness are subconsciously exalted as the end of all excellence; the victim may gravely, after deliberate discussion in his quavering and ill-controlled voice, discard hat or shoes,—for it is in this stage that Mexicans generally and Americans frequently begin to strip themselves of clothing—or spurn the gold which he has been seeking or the tobacco which has been his solace, or perhaps burden himself with a heavy cask or fragile demijohn. The face grows pinched and care-marked, the eyes bloodshot and perhaps tearful, the movements ill-aimed, the utterances capricious, while the temperature rises and the pulse quickens: the sufferer is a walking fever patient, passing or passed into a delirium usually wild and paralyzing in the tenderfoot, but concentrated on a central instinct in the desert habitue—the instinct of the trail, or the way to water. The disordered state of body and brain is often revealed by ceaseless talk: the sufferer strains tongue and throat to “talk and talk and talk, without prevision of the next sentence or memory of the last—and all the talk is of water in some of its inexpressibly captivating aspects. A group of ranchmen, tricked by an earthquake-dried spring, craked and croaked of rivers they had forded in '49, of the verdure of the bluegrass region in which one of them was born, of a great freshet in the Hassayamp' which drowned the family of a friend and irrigated the valley from mountain to mesa, of the acre-inches of water required to irrigate a field seeded to alfalfa, of the lay of the land with respect to flowing wells, of the coyote's cunning in 'sensing' water five feet down in the sand, of the fine watermelons grown on Hank Wilson's ranch in Salado valley; now and then articulation ceased and lips and tongue moved on in silent mockery of speech for a sentence or two before the sound was missed, when with painful effort the organs were whipped and spurred into action and the talk rambled on and on—all talking slowly, seriously, with appropriate look and gesture, not one consciously hearing a word. When I was deceived into dependence on the brine of a barranca in Encinas Desert, thirst came, * * * and some of the party babbled continuously of portable apparatus for well-boring, of keeping kine by means of the bisnaga—a savagely spined cactus yielding poisonless water—and reveling in milk, of the memory of certain mint juleps in famous metropolitan hostelrys on the farther border of the continent, of the best form of canteen (which should hold at least two gallons—three would be better); they were bright men, clear and

straight and forceful thinkers when fully sane: yet they knew not that their brilliant ideas and grandiloquent phrases were but the ebullition of incipient delirium, and seriously contracted for five gallons of ice-cream to be consumed by three persons on arriving at Hermosillo, and this merely as dessert!" This phase is well known on the range, where many survive it and some delude themselves with the notion that it marks all there is of thirst; and scores of survivors have hit on the same expression to denote it: it is the *cotton-mouth* phase.

Thirst in this phase is best relieved by water—water swallowed in quarts, preferably a gill at a gulp with time for breathing between, and snuffed anon into the nostrils—water also slushed over face, head, neck, and chest: and where conditions permit, hot coffee or soup, the nearer the scalding point the better. Some desert rovers limit the quantity—wisely when the water is salt-charged or microbe-laden,—though there is little risk to the habitue if the water be pure; the tenderfoot may overcharge his system and so burden his heart and invite collapse next day. When water is scant (as always on the range and often in camp) it may be economized by a method well known in all arid regions—that of alleviating local dryness of the buccal and other membranes by sipping and sniffing a few drops at a time, and allowing the general condition to take care of itself. Many vaqueros and prospectors become artists in mouth-moistening and carry canteens only for this purpose (depending on lavish draughts at camp to supply the general needs of the system), and unwittingly follow the example of desert plants in habituating their external tissues to conservation rather than evaporation of the organic water; the sipped liquid lubricates the membranes, permeates both cavities and tissues, facilitates automatic swallowing of saliva and spitting of effete mucus, and compensates that evaporation accompanying respiration which most effectively controls the body-temperature—as demonstrated by the sweatless but panting dog. On the empirical practice of the range even expert medicine may hardly improve; and unless complications arise, dry medicaments are useless—or worse.

c. The later phase of functional derangement is an intensification of the earlier; saliva ceases, and membrane-mucus dries into a collodion-like film which compresses and retracts the lips, tightens on the tongue until it numbs and deadens, shrivels the gums and starts them from the teeth, and shrinks linings of nostrils and eyelids giving irritating sensations of dust and grit; tears fall until they are gone, when the eyelids stiffen and the eyeballs set themselves in a winkless stare; the distal tongue hardens into a senseless weight, swinging on the still-soft root and striking foreignly against the teeth with the movement of riding or walking; articulate speech ends, though hoarse moanings or wierdly unhuman bellowings may issue from the throat. Gradually the shrinking extends from membrane to skin; numbness creeps over the face, then over

the hands and under the clothes, imparting a dry, rattling, hush-like sensation so nerve-trying that few longer resist the impulse to cast off clothing in automatic outreaching for relief; the feeling of fullness in the head increases and extends to the chest; the sufferer spasmodically snatches at hat and hair and tears the scalp with his nails, while breathing becomes labored and gasping; the heartbeat grows slow and heavy, and each pulsation brings kaleidoscopic gleams before the eyes and crackling and tearing noises in the ears, perhaps passing into singing sounds simulating—and sometimes mistaken for—sweet music from some unseen source; the head throbs painfully, and excruciating twinges shoot from the nape down the spine and through neck and shoulders; the hearing is more and more disturbed and the seeing distorted by the desiccation of the tissues, and hallucinations arise constantly to pass quickly into complete delirium in all but the best-inured, and even in these unto insanity of all senses save that of the trail. When Doctor Merriam was caught on the threshold of this phase of thirst he was impressed by the labored beating of his heart, and gained a sense of the gradual thickening of his blood as its liquid portion evaporated; "he was unable to see, or saw in mirage-like distortion when they were pointed out to him, the familiar birds and mammals of which he was in search. A prospector, later in the stage, tore away his sleeve when the puzzling numbness was first felt; afterward, seeing dimly a luscious-looking arm near by, he seized it and mumbled it with his mouth, and greedily sought to suck the blood; he had a vague sense of protest by the owner of the arm, who seemed a long way off, and was astounded two days later to find that the wounds were inflicted on himself. Deceived by a leaky canteen on the plateau of the Book Cliffs of Utah, I held myself in the real world by constant effort, aided by a bit of mirror an inch across whereby forgotten members could be connected with the distorted face in which motionless eyes were set; yet I was rent with regret (keen, quivering, crazy remorse) at the memory of wantonly wasting—actually throwing away on the ground!—certain cups of water in boyhood, and gloried in the sudden discovery of a new standard of value destined to revolutionize the commerce of the world—the beneficent unit being the rational and ever-ready drop of water. I collected half a dozen double-eagles from each of four pockets, tossed them in my hand, scorned their heavy clumsiness and paltry worthlessness in comparison with my precious unit, and barely missed (through a chance gleam of worldly wisdom) casting them away on the equally worthless sand." With the advancement of this phase, fever burns more and more fiercely; yet several observers have concurred in denoting it by perhaps the most distinctive local condition: it is the phase of the *shriveled tongue*.

In this phase, too, the thirst is relieved only by water—water in gallons, applied inside and out, but with caution as to rate lest the desiccated

tissues be saturated so suddenly as to set up dangerous disorganization. Save in cases of the strongest constitution, the water should be supplemented either by some febrifuge (perhaps aconite) or, if the sufferer is so inured that his tissues are toughened, by a heart-tonic to hold up the circulation despite the dilution of the blood as the alleviating water finds its way into veins and arteries. In the absence of water little can be done; heart-stimulants or nerve-sedatives might be beneficial if available, though alcohol usually does more harm than good; the experiment of moistening membranes of mouth and throat (and of nostrils and windpipe and bronchia by inhalation) with glycerine—perhaps dilute—would be worth trying; while unguents applied to the tightening skin of chest, neck, and head might be beneficial. The over-stressed system seems to respond sluggishly and slightly to ordinary drugs; when I left my party in Seriland in the closing days of 1895 and trudged over the sierritas and sand-wastes 55 miles to the ranch of San Francisco de Costa Rica for water and less essential supplies, all liquids in the medicine case (except laudanum and castor-oil) were consumed; a brandy and blackberry compound, listerine, extract of witch-hazel, sweet oil, cascara extract, eye-water, et al; but no effects were reported—or detected. It is in this phase if not before that most sufferers are led, either by aimless instinct or the reasoned desire of keeping membranes moist, to have recourse to urine—either their own or the still saltier stale of their stock: a desperate device which sometimes saves life at the cost of some poisoning of the system, but doubtless hastens the end of the inured.

3. *The Stage of Structural Degeneration.*—d. The passage of the thirst-patient into the earlier phase of this stage depends largely on his physical condition, especially his inurement to heat and dryness (as well illustrated by the case of Pablo Valencia); the tenderfoot makes the transition quickly and completely, while the well-inured victim whose membranes and skin are toughened and habituated to conservation of organic water may resist the tissue-disorganization up to and even beyond dissolution when the air is dry enough and the heat high enough—the dissolution in this case being a progressive mummification of the initially living body, beginning with the extremities and slowly approaching the vital organs. In the ordinary case the fourth phase begins with an acceleration of the drying process due to disorganization of external tissues: the collodion-like coating on the lips cracks open and curls up, and the clefts push into membrane and flesh beneath so that thickened blood and serum exude; “this ooze evaporates fast as formed, and the residuum dries on the deadened surface to extend and hasten the cracking; each cleft is a wound which excites inflammation, and the fissuring and fevering proceed cumulatively until the lips are everted, swollen, shapeless masses of raw and festering flesh. The gums and tongue soon become

similarly affected, and the oasis in the desert appears in delirium when the exuding liquid trickles in mouth and throat; the shrunken tongue swells quickly, pressing against the teeth, then forcing the jaws asunder and squeezing out beyond them, a reeking fungus on which flies—coming unexpectedly, no one knows whence—love to gather and dig busily with a harsh grating sound, while an occasional wasp plunks down with a dizzying shock to seize or scatter them; and stray drops of blood escape the flies and dribble down the chin and neck with a searing sensation penetrating the numbness: for the withered skin is ready to chap and exude fresh ooze, which ever extends the extravasation. Then the eyelids crack and the eyeballs are suffused and fissured well up to the cornea and weep tears of blood; and as the gory drops trickle down the shrunken cheeks are welted with raw flesh. The sluggishly exuding ooze seems infectious; wherever it touches there is a remote, unreal prickling, and lo, the skin is chapped and dark red blood dappled with serum wells slowly forth. The agony at the nape continues, the burden of the heart-throb increases, but as the skin opens the pain passes away; the fingers wander mechanically over the tumid tongue and lips, producing no sensation save an ill-located stress, when they, too, begin to chap and swell and change to useless swinging weights * * *. The throat is as if plugged with a hot and heavy mass, which gradually checks the involuntary swallowing motion, causing anon a horrible drowning sensation, followed by a dreamy gratification that the trouble is over. The lightning in the eyes glances and the thunder in the ears rolls, and the pressing brow-bands tighten. The thoughts are but vague flashes of intelligence, though a threadlike clue may be kept in sight by constant attention—the trail, the trail, the elusive, writhing, twisting trail that ever seeks to escape and needs the closest watching; all else is gone until water is 'sensed' in some way which only dumb brutes know. * * * Rice remembered hearing his horse (which, startled by a rattlesnake, had escaped him twenty hours before, and which he had trailed in half-blind desperation) battering at the cover of a locked watering-trough with fierce pawing like that of a dog digging to fresh scent; the vaqueros, awakened by the horse, found the man wallowing, half-drowned in the trough; he always ascribed the bursting of his lips and tongue to his earlier effort to get moisture by chewing stray blades of grass (supplemented by urine), and he never consciously recognized the normal symptoms of the fourth phase. When my deer-path trail on the Utah plateau turned out of the gorge over a slope too steep for the fixed eyes to trace, I followed the ravine to stumble into a chance water-pocket with a submerged ledge and there soaked an hour before a drop of water could be swallowed; then, despite a half-inch cream of flies and wasps, squirming and buzzing above and macerated into slime below, I tasted ambrosia! A poor devil on the Mohave desert reached a neglected

water-hole early in this stage; creeping over debris in the twilight, he paid no attention to turgid toads and a sodden snake and the seething scum of drowned insects until a soggy, noisome mass turned under his weight, and a half-fleshed skeleton, still clad in flannel shirt and chaparreros, leered in his face with vacant sockets and fallen jaw: he fled, only to turn back later, as his trail showed, seeking the same water-hole, and during his days of delirium in the hands of rescuers raved unremitting repentance of his folly in passing the 'last water'." A bronco-thrown vaquero picked up by Don Pascual Encinas after three days of deprivation was expressively described by the strenuous old "Conquerer of the Seri" as "sweating blood and fighting buzzards;" and his phrase may fitly be applied to the phase of desert thirst in which the external tissues inflame and begin to break down in a *blood-sweat*; the phase is not in the books, but it is indelibly burned into some brains.

In this phase there can be little alleviation: for water, however judiciously administered, brings hurt rather than healing; and even if the degenerated tissues are reorganized, the cerebral and neural structures may scarce recover from the shock—the sufferer, like the Encinas foundling, or like press-reported Hoffman, sole survivor of the ill-outfitted Grindell expedition of 1905, remains little more than a gibbering imbecile for months if not for life.

e. In the final phase of desert thirst the external symptoms are little changed: "The benumbing and chapping and suffusion of the periphery and extremities continue, and in this way the blood and serum and other liquids of the body are conveyed to the surface and cast out on the thirsty air, so that the desiccation of the organism is hastened; perhaps the tumid tongue and livid lips dry again as the final spurts from the capillaries are evaporated; thirsty insects gather to feast on the increasing waste, and the unclean blow-fly hastes to plant its foul seed in eyes and ears and nostrils, while the greedy vulture soars low and the ravening coyote licks his chops." The internal or subjective symptoms may be inferred only through extension of the knowledge of earlier stages and from movements inscribed in the trail of the victim—for in the desert perception is sharpened and scarce-visible features in the track of man or beast open a faithful panorama to the trained vision of the trapper: "the wanderer, striving to loosen the tormenting brow-bands, tears his scalp with his nails and scatters stray locks of hair over the sand; the forbidding cholla, spiniest of the cruelly spined cacti, is vaguely seen as a huge carafe surrounded by crystal goblets, and the flesh-piercing joints are greedily grasped and pressed against the face to cling like beggar-ticks to woolen garments, with the spines penetrating cheeks and perhaps tapping arteries; the shadow of shrub or rock is a Tantalus' pool in which the senseless automaton digs desperately amid the gravel until nails and even phalanges are torn off; then the face is forced into the

cavity, driving the thorns further into the flesh, breaking the teeth and bruising the bones, until the half-stark and already festering carcass arises to totter toward fresh torment * * *. A child in a single garment wandered out on Mohave desert and was lost before the distracted mother thought of trailers; his tracks for thirty hours were traced, and showed that the infant had aged to the acuteness of maturity in husbanding strength and noting signs of water, and had then slowly descended into the darkness and automatic death of the fifth phase of thirst—had at last dug the shadow-cooled sands with tender baby fingers, and then courted and kissed the siren cactus even unto the final embrace in which he was held by a hundred thorns too strong for his feeble strength to break."

In this final phase there is no alleviation, no relief save the end; for it is the ghastly yet possibly painless phase of *living death*, in which senses cease and men die from without inward—as dies the desert shrub whose twigs and branches wither and blow away long before bole and root yield vitality.

As I passed through Yuma, August 31, 1905, press dispatches were announcing a fatality from thirst in Death Valley, incidentally noting that it was the *thirty-fifth* of the season in that valley alone; unnumbered others occurred elsewhere during the same season, including a straggler whose remains were found two months later by the Jim Tucker and Pablo Valencia above mentioned. Does it not behoove the makers of medical science to assume seriously the duty of devising preventive and remedial measures against a death-cause so frequent, so widespread, so distressful, and so intimately connected with those organic functions and structures on which they speak with authority; and does not the behoof rest especially on the medical men of the Key City of the Southwest—Saint Louis?

SHOULD EDUCATION IN SEXUAL MATTERS BE GIVEN TO YOUNG MEN OF THE WORKING CLASSES?

BY L. DUNCAN BULKLEY, A. M., M. D., New York.

Few will deny that a certain amount of education or enlightenment along some medical lines is advantageous to the general public. Undoubtedly the information which has been given in later years in regard to the first aid to the injured, and those drowned, has saved many lives, and that in regard to tuberculosis is gradually working out benefits which will continue to increase as time goes on. Adequate knowledge concern-

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ing diet and hygiene cannot but result in good among all classes of the community, and personal hygiene is not the least important.

The question has recently arisen and has been studied by certain congresses abroad, notably those held in Brussels, and more recently by the Society of Sanitary and Moral Prophylaxis in New York, as to how far education in sexual matters will tend to the diminution of venereal diseases, which have been called *The Great Black Plague*, as these are well-known to be productive of serious results both to the guilty or unfortunate individual and to unnumbered others, wholly innocent. Is it not time that serious consideration should be given to the best means for checking a class of maladies, however they are first acquired, which are productive of such great loss to the state in the way of death, wrecked lives, disablement and consequent degradation, to say nothing of marital misery and broken homes? As one who has seen hundreds, yes thousands, of persons thus afflicted, in public clinics and hospitals, I must answer emphatically, yes.

The question arises, what can be done? Not to attempt anything, and to leave matters just as they are means only an increasing spread of this class of troubles, until this country is as thoroughly infected as are many other localities in the world.

The various systems of police regulation and medical inspection which have been tried in various cities in Europe have not yielded the results which had been hoped. Very properly, thoughtful persons have developed the idea that efficient education and enlightenment would aid in more or less eliminating this source of social danger and result in great advantage to the community. The subject of the proper education of the more intelligent and educated classes has already been considered, and the question how far education in sexual matters should be given to the working classes is well worthy of consideration.

Every argument for instruction to the more enlightened students in high schools, colleges and seminaries applies here with a thousandfold more force.

Prostitution, as ordinarily recognized or rather as it flaunts itself before the public, refers generally, I believe, to the more educated, or at least to the more affluent classes of society; but it is a mistake to think that the evil is at all confined to them. Far below the gilded haunts of vice of the Tenderloin district lies the "red light" area of the great East Side, to which so much attention was directed by the public press some time ago. And far below this are the unspeakably low resorts of the water edge, where sailors and others are enticed and degraded and criminals of both sexes are fostered and made.

Social workers will certainly fall far short of their duty if they fail to extend a helping hand to the submerged tenth, and even to the criminal in his cell or the culprit in the reformatory or penitentiary. For venereal

diseases, with their manifold and direful results, so frequently reaching to and working havoc among those who are perfectly innocent, will never be checked until in some way even the lowest levels of society are influenced toward their prevention.

It is not necessary to enter upon any extended medical statements in regard to the ravages inflicted by venereal diseases upon innocent victims. But as a physician, who for many years has observed and studied this phase of the subject, I must say a few words to make later statements and arguments more effective.

While these diseases are undoubtedly communicated more frequently by means of sexual transgressions, medical records demonstrate absolutely that thousands, tens of thousands, yes hundreds of thousands, have acquired them quite as innocently as the child contracts measles, scarlet fever or whooping cough; that is, wholly apart from any sexual or other transgression. Indeed, no one can be absolutely sure of escaping infection in a perfectly innocent manner. This may, perhaps, to laymen seem a strong statement, but I am confident that every physician who is at all acquainted with the subject will bear me out in the assertion.

Syphilis is known to be extremely infectious during its early periods, not only from the first local sore, or chancre, but also from raw surfaces on the mucous membranes, known as mucous patches, which are often unnoticed and hardly suspected by the patient. To show how dangerous the disease may be, I may mention that one eminent syphilographer has recorded the fact that one single syphilitic woman who had come under his observation had succeeded in infecting with syphilis no less than three hundred men within a period of ten months. Imagine one small-pox patient being allowed to give the disease freely to three hundred individuals! But this, of course, is only the beginning, and these three hundred infected individuals go on giving the disease to others, and often in the most innocent manner.

It has been shown repeatedly that in private practice fully fifty per cent of the married women who have syphilis have contracted it innocently from their husbands. If to this item of the ravages of syphilis is added the large number of innocent children who have inherited the disease, and also the many thousands who have been accidentally infected on various parts of the body, often in the most surprising and unexpected manner, we see that this is indeed a disease which should no longer be ignored, and in regard to which ignorance might even be called a crime.

Through ignorance syphilis has spread to an alarming extent in Russia, where it is so common among the peasantry that it has long been regarded as a scourge in the widest sense of the word; in some villages at least one-quarter of the inhabitants are infected. It is estimated that fully seventy-five per cent of this is acquired innocently in family life and not through prostitution; though in each instance the disease started, possibly or probably, in some one who had acquired it immorally.

Gonorrhœa also has a frightful history sociologically, and the public, certainly the youthful public, are less informed as to its ultimate dangers, and more careless, if possible, in regard to guarding against them, than they are in respect to syphilis. Many consider the trouble as "no worse than a bad cold," and yet close observation has clearly demonstrated that the poison of gonorrhœa may be long latent, and that it can be, and often is, the cause of an enormous amount of disease, suffering and disablement, very frequently to innocent persons.

Reliable estimates have been made showing that fully twenty per cent of all blindness is due to gonorrhœal infection of the newborn. Also that fifty per cent of all involuntarily childless marriages are caused by gonorrhœa in the female, and of these forty-five per cent are due to marital infection by men. Finally, that eighty per cent of all deaths from pelvic diseases in women are due to the results of gonorrhœa.

Is it any wonder, then, that the medical profession, who have long been cognizant of such facts—which of late years have been accumulating with scientific accuracy—should have made various attempts to arouse the public, in order that the masses may be enlightened and guarded against this "great black plague" of venereal diseases, as they are now in a measure instructed to guard against the "great white plague," tuberculosis?

Both of these great enemies of mankind have heretofore been ignored through ignorance, and neglected through negligence.

If all could sit, as in earlier days I have sat, day after day in a venereal clinic in one of the hospitals or dispensaries, and could see the ignorance, carelessness and even recklessness exhibited by many from the poorer classes coming there with syphilis and gonorrhœa during their most infective stages, and could see their utter neglect of sanitary precautions and the indifference often shown in regard to spreading the disease, there would be no question but that a campaign of education and enlightenment is advisable and necessary to the great body of young men of the working classes.

Not only have I found such patients utterly ignorant of any possible dangers to innocent members of their families, but I have experienced the greatest difficulty, in the short time possible in the clinic, in making them understand the precaution which should be taken to prevent such accidents.

It is not necessary to go further into the consideration of the medical aspects of venereal infection, or rather the results occurring from infection by diseases which are usually classed as venereal, but it might be well to emphasize some of the sociological features connected therewith. The losses resulting to the community are great. Vast numbers of patients thus afflicted throng the clinics and fill the hospital beds in this country and Europe, and the loss of time, and consequently of earnings, can hardly be computed. In all this it is to be remembered that it is not only the

acute or early stages which produce incapacity and interfere with employment, but that the later results of neglected cases, in both men and women, are often most disastrous to health and strength. The misery which so often comes to the innocent wife should alone be sufficient to call for the utmost endeavors to diminish, at least, the ravages of this class of diseases. Unfortunately the acquirement of venereal diseases in the ordinary way is intimately connected with the abuse of liquor. For, as a patient recently remarked to me in my office, "Every one knows that without liquor there would be much less venereal disease." But in spite of this bad handicap to the success of the educational efforts, it can not be doubted but that with patient and intelligent labor much good can be accomplished.

Of the desirability of giving enlightenment to the mass of young men and women, which shall in some way aid in checking the "great black plague," I think there can no longer be any question. For at the present time the youth of the country, in all classes of society are left in absolute ignorance, and gain what information they have in regard to sexual matters from depraved associates, and are most naturally led by them into evil habits. In regard to the nature and danger of venereal diseases they are left entirely in the dark. Recently at the George Junior Republic a good friend had an earnest talk with one of the boys on the subject of sexual vice and dangers. The boy was greatly interested and took it very seriously and gratefully, expressing much wonder that no one had ever addressed him thus on the subject before.

It is recognized that the subjects under consideration are most difficult and delicate ones to handle, but all who have given much attention to them will agree that human thought and ingenuity should overcome the difficulties and find means for giving the enlightenment required and desired. The question now before us is only: Should this help be given to the young men of the working classes? and I think that enough has been said to show that there is urgent need of this; how it shall be accomplished is another matter, worthy of serious study and earnest purpose.

EDUCATION IN SEXUAL HYGIENE FOR YOUNG WORKING WOMEN.

MARGARET A. CLEAVES, M. D., New York.

Innocence and ignorance are not necessarily one and the same thing, although they are so regarded by many people of intelligence and broad culture. That there is an instinctive shrinking on the part of girls and

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women, whatever their class, from any discussion of sexual matters goes without saying. This fact, however, has no bearing on the question of the necessity of education in these matters for all classes.

To the question whether young women of the working classes should receive such education there can be but one answer. Knowledge in these matters is essential if they are to preserve intact their health, their procreative power and their purity. Ignorance is perhaps the most serious among the factors which work together to bring many working girls to ruin. The inducements in the way of dress, jewelry and amusements which are used to overcome the scruples instinctive to every woman would have far less weight if the consequences of indulgence were clearly understood. Every physician whose practice has brought him in contact with working girls can recall case after case in which ignorance and credulity have been traded upon with disastrous results to the girls. Many instances might be cited, from the writer's experience, in which the assurance has been given, and believed, that by permitting sexual intercourse various physical disorders would be cured. Had the girls in these cases been taught in the proper manner the fundamental principles of sexual physiology they would have known that the ills about which they were concerned could not be relieved in this way, but that instead they were running the risk of being committed for life to shame, loathsome disease and poverty.

Granting, therefore, the necessity for education in these matters, the question requiring consideration is how such education can be given.

From the medical woman's point of view all young women, no matter what their class, should receive such physiological education as would enable them to understand their special anatomical conditions and physiological functions and the relation of these special organs and functions to reproduction. This information should not be hurled at the individual or individuals as though the physiology of the sexual organs was of paramount importance, nor should it be given with bated breath as though it were a matter not to be thought or spoken of. It should follow upon a consideration of general physiology and be presented so as to form but an integral part of the whole. This can be done in a simple, forceful, dignified manner that will carry no suggestion of evil, but on the other hand help to unfold one of the most beautiful pages of nature's book, i. e., the relation of these functions under normal conditions to the grand creative plan. To even the untrained intelligence an idea of the unity and grandeur of this plan and its relation to the entire physical world can be conveyed. From a biologic point of view the reproductive function is the most important function of the human body, and yet, almost without exception, it is a subject that is not only ignored by parents and instructors of the young, but in the case of the young women of the working classes, nearly every avenue through which they could be reached has its cerberian guardian crying "hands off." "You can only touch

upon those subjects in the rarest instances," it is said; or, "this is not the place for the work of a society having for its aims sanitary and moral prophylaxis."

These objections, however, must not be regarded as insuperable obstacles to necessary hygienic and physiologic teaching. On the contrary they should but serve as a stimulus to a crusade against ignorance and prejudice and as a beacon to light the way to the correct teaching of sexual physiology.

Education must begin with the young. Simultaneously with this education, or when it is under way, the education of parents and teachers must be undertaken. The importance of the matter precludes the possibility of depending upon the education of parents, first, for not only is it a matter of their education, but of combating their prejudices and perverted ideas. Where shall this education be given and by whom? Fundamentally every influence should be brought to bear to secure needful instruction from parents. In addition to the teaching of physiology in the public schools, which is largely perfunctory and without that broad knowledge which tends to make simple and luminous bare physiological facts, and which stops, so far as girls are concerned, with a bare mention of the pelvic organs and the fact of menstruation, but not of their relation to the phenomena of reproduction, there should be added a talk on sexual physiology from an authoritative source. Instruction in physiology is given in the fourth grammar grade and to girls from thirteen to sixteen, just when physiologically the necessity arises for the possession of this knowledge to the end of safeguarding their health and preserving their purity. But the simplest physiological facts are imparted in such a manner that the child is left to puzzle over the meaning of words and to associate a term with the thought that it is something which they are not intended to understand. Duodenum, for example, was used by a teacher in such a way that the term was kept in the mind of a young working girl from her grammar school days to the age of twenty, when, believing it bore some suggestive significance, she asked me what it meant. Likewise instruction as to the anatomy and physiology of the reproductive organs is given in a manner, if given at all, that has no bearing upon the phenomena of life, and either is without significance or suggestive of a wrong and hidden meaning.

This is all unnecessary. Much more fortunate was a patient of mine, who from their infancy and childhood had entire charge of the three orphan daughters of her sister. In describing the shape, size, position and supports of the reproductive organs, their physiological function and relation to reproduction, it was done in so dainty a manner and with such graceful imagery that one of them exclaimed: "Oh, I know, Auntie, just like an oriole's nest." There could be no prettier conception, but it could only be made to appeal to the child more or less familiar with nat-

ural history, a study of which would lead without a false step to the important biologic phenomena of reproduction.

Mothers and teachers who know that young girls under their care are not in ignorance of sexual matters, steadfastly close their eyes to the fact and believe that in ignoring them, all dangers will be averted. As attendance at school is required to the age of fourteen there should then be no trouble in imparting this necessary instruction or preliminary physiological education in the public schools.

But there are many avenues through which young women of the working classes can be reached for more advanced instruction if the age limit required for attendance upon public schools finds them too young. There are many working girls' clubs. For example in New York city the New York Association of Working Girls' Societies has thirty-two distinct branches. The Association of Neighborhood Workers represents fifty settlements that also have such clubs. This makes eighty-two centers; then there are the Girls' Friendly, Manhattan Working Girls' Clubs, and others. Without making an exact statistical estimate, it is safe to say that there are at least two hundred or more such organizations. Churches also have their friendly societies and leagues, where it should be possible to get into touch with the young women of the working classes. The Young Women's Christian Association opens up still other opportunities. Other avenues which suggest themselves to my mind are the large department stores and manufactories, where vast numbers of young women are employed who are especially exposed to untoward influences. Some of the department stores have already adopted measures, which, if followed up, should readily lead to opening the way for the work.

Siegel & Cooper employ a male physician who is on duty from nine to five, and is paid by the firm and they also employ an untrained nurse; Wanamaker has a private physician on call and employs a trained nurse—both places have a mutual benefit association for employes; Altman has a private male physician on call; Simpson & Crawford call one when needed; Macy's is the only firm, to my knowledge, which employs a woman physician.

Women's clubs could do no nobler work than to secure needed teaching for themselves, and in turn assist in the education of those less fortunately placed. In the centers where working women congregate a woman physician should either be employed or be on call, in addition to the male physician, and through her relation to her employers and their employes there should be no difficulty in securing opportunities for necessary instruction. A part of her duty should be to supplement the meagre school education in physiology and add to it necessary instruction in sexual physiology.

This special instruction, so far as it concerns girls and women, by reason of its very nature should devolve upon women physicians. But

when men, after long years of all the privileges of the medical profession, are only just waking up to the need of concerted action in these matters, it is not strange that medical women, whose professional privileges and opportunities are not only of shorter standing but of much less scope, are not yet fully awake to the need of their sex and their duty in relation thereto.

In so far as young women of the working classes are to be reached, outside of their mothers' teaching, instruction can only come from competent medical women, or, when by nature and education, especially qualified the trained nurses employed by corporations like those mentioned.

That this may be effectively done requires a perfect and complete organization of women of the profession, who must be animated by a unity of purpose and action. To insure the success of such a body, not only the moral support, but the authoritative backing of this parent organization will be required. The way will not be easy, and infinite tact, great patience, persistence, wide learning and broad humanity must be brought to the work. It will require all these as embodied in their representative intelligence of this society to overcome the prejudices of those who stand between it and all the organized centers of working women.

Although animated by the noblest motives the professional philanthropists are apt to approach the subject with a certain mawkish sentimentalism. They say it is a very delicate subject, and by its discussion more harm than good is done. "Not until the ideal woman physician arrives can it be done, and how we shall welcome her! But she will have to be ideal," is the sentiment of others.

Even the settlement workers, in so far as I have spoken with them, feel it a very difficult situation, and are disposed to cry, "Hands off!" They regard the safeguarding of those of very tender years as of very great importance (those who are presumably too young to be instructed), but, in the opinion of these workers, nothing can be done, save by warning girls in general terms. They are unable to convince themselves that much more than this can be accomplished with audiences or with small groups of girls.

It is believed that the mothers of the East Side, for example, are less apt to be negligent in the matter of necessary instruction to their daughters in connection with their sexual physiology, than mothers of better circumstances, if I may so distinguish. They are forced to this by reason of their crowded rooms and promiscuous living. Unquestionably the evils arising from a lack of education would be lessened by model tenement houses with facilities for necessary personal privacy.

The whole attitude of those standing in the position of guardians, whether natural or self-imposed, toward instruction in these matters is wrong. As this teaching is not, cannot, or will not be given by parents,

philanthropists and others who have the opportunity, sexual physiology should in a perfectly natural, commonplace manner, form a part of the curriculum of school education or of the lectures furnished by the management of working girls' clubs, or given by the employers of large numbers of young women. This instruction should preferably be by word of mouth, for it is by the silent perusal, even of the most carefully worded leaflet or books, that the undisciplined mind is apt to be led astray. The printed word is often read at first, not always with a knowledge that it is so read, for sensual gratification. Teachers are ignorant of what they teach when it comes to physiology. If they are to take part in giving instruction they should be specially qualified. The tendency of the day toward greater attention in the public schools to the study of natural history, physics and biology will aid in the development of a higher intelligence and conception of life in all its aspects on the part of the teachers, the benefits from which must be reached by the young under their care.

A considerable experience in my early professional life with penal, reformatory and eleemosynary institutions showed me that reformatory measures were of little avail. When health is broken an effort to reform is made, but with its return a life of immorality is renewed. Therefore the greater need for education and prevention.

The lack of education in these matters leads not alone to immoral practices, but is prejudicial, as well, to that perfect health which should be the God-given right of every human being. Because of a lack of knowledge, menstruating girls lay the seeds for lives of wretched invalidism. The ignorant, but pure young woman, marries without knowledge of the dangers which await her, for unfortunately, the code of honor makes right for man that which women dare not do under ban of social ostracism. The result is disastrous in the extreme—a ruined life of wretched invalidism. This may happen whatever the social position. With a practice which has in no sense a venereal aspect, fully one-half of my gynecological classes are of gonorrhœal origin and they are the saddest cases with which I meet.

But while realizing the great necessity of education in sexual physiology for all women it should embrace none of the prurient nor flippant information already too common among all classes, but should be so natural, simple and dignified as to arouse no thought of evil, but to serve as an armor against it.

SECONDARY EPITHELIOMA OF THE AXILLARY NODES
WITH INVOLVEMENT OF A LARGE NERVE.*

BY HARVEY G. MUDD, M. D., AND GUTHRIE McCONNELL, M. D., St. Louis.

Cases of carcinoma in which there has been extension or direct involvement of nerve structures are not so numerous as to permit their being passed over unnoticed. The literature on the subject is extremely limited but what there is opens up some interesting points for discussion. It is well known that there are lymph spaces surrounding nerves and also passing along within them but their relation to malignant disease seems to have been but slightly considered.

The following references are taken from a recent article by Ernst who has reviewed the literature and found very little upon the subject.

Thoma believes that the sheaths and coverings of the peripheral nerve filaments not infrequently allow the extension of carcinomatous elements. He cites a case of carcinoma of the lower jaw in which there was an extension of the growth along the inferior maxillary nerve to the posterior foramen. He also mentions a case of involvement of the nerves in the neighborhood of a carcinoma of the uterus.

Klebs reports a case of a papillary carcinoma of the conjunctiva with extension of the tumor cells in the lymph channels of the nerves of the eye muscles.

Pilliet reports a case almost identical with ours. His was a case of recurrent carcinoma of the breast in which there were metastatic nodules in the axilla which surrounded and practically destroyed the median nerve. This structure contained cancer cells in the lymph spaces. During life there was pain and also trophic disturbances.

Ernst reports several cases of nerve involvement. These can be briefly described as follows:

1. Carcinoma of the esophagus in a 38-year-old woman in which esophageal branches of the vagus contained tumor cells.

2. Italian woman, 44. Carcinoma of the uterus. Was removed and returned. During life had considerable pain. Examination showed the presence of cancer cells in the sacral plexus, in both the perineural and endoneural lymph spaces.

3. Man, 60. Recurrent carcinoma of the pancreas. Was accompanied by severe pain. Numerous branches of the inferior gastric plexus were found to contain epithelial cells in both peri and endoneural spaces.

4. Man. Prostatic carcinoma. Tumor cells found in a ganglion.

5. Man, 44. General carcinomatosis, with involvement of the vagus.

6. Woman, 60. Ulcerating carcinoma of the pylorus with involvement of the nerves in the stomach wall.

*Read before the St. Louis Surgical Society, January 17, 1906.

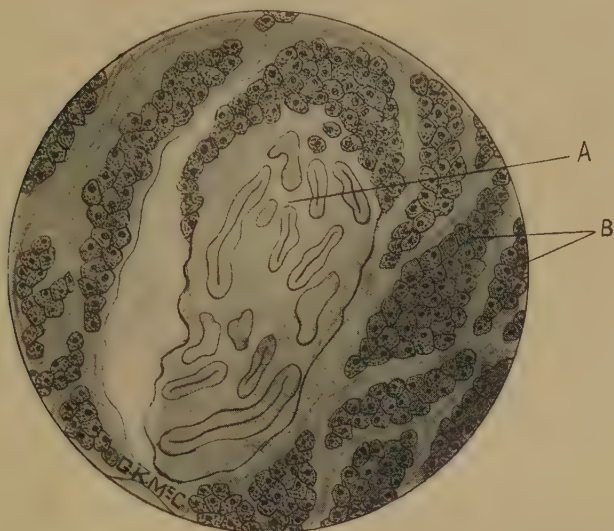


FIG. 1.—A, nerve bundle showing infiltration of carcinoma cells. B, nests of tumor cells.

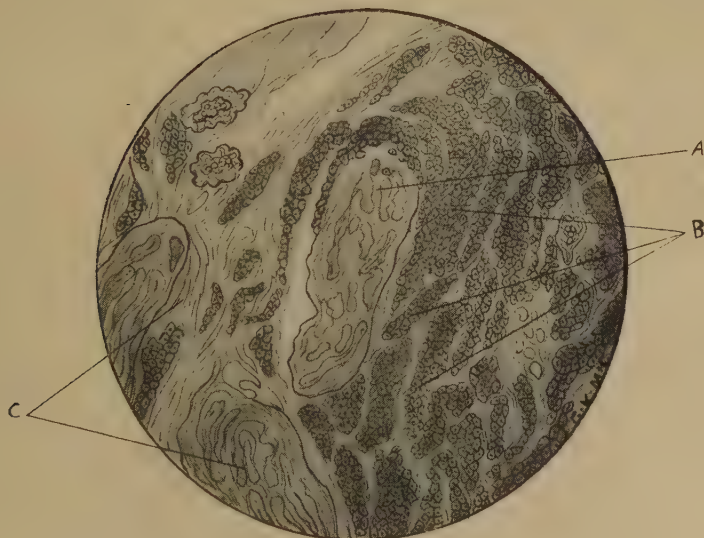


FIG. 2.—A, nerve bundle showing infiltration of carcinoma cells. B, nests of tumor cells. C, uninvolved nerve bundles.

7. Man, 59. Ulcerating carcinoma of the esophagus, with tumor cells in the recurrent laryngeal. The involvement was so great as to cause paralysis.

It might be that in some cases in which there were secondary growths the metastases may have taken place along the lymph spaces of the nerves. This would seem to present a new problem to the surgeons because if removal of the lymph nodes were not sufficient it might be that in some cases excision of the nerves would have to be resorted to.

The case that we have to report is as follows:

E. Q. Female, 70. Married. Family history, negative in regard to tumors of any sort. She has always been well until the present trouble.

About four years ago while scrubbing the floor she ran a splinter into the palmar surface of her left hand at the junction of the first and second fingers. No trouble arose till about three months after the injury, when she began having some pain in her left hand. In the course of another three months (about June, 1902) an ulcer began at the seat of the injury. The hand became very painful and the ulcer extended till a large part of the palm was involved.

For a year and a half she was treated by the x-ray without any apparent benefit, the ulceration slowly spreading. Finally, last March (1905) she went into a hospital and had her hand amputated at the wrist. At that time a large ulcer involving the first and second fingers of the left hand was found. The hand was considerably thickened but the thumb seemed entirely free and outside of the area of infiltration. On the fourth of March the hand was amputated. The operation was an interesting one in that no general anesthetic was used. The skin at the outer side of the arm just above the elbow was infiltrated with a 1-10 per cent cocaine solution and a long incision made through a considerable quantity of fat. The musculo-spiral nerve was found with a good deal of difficulty and a 1 per cent solution of cocaine injected directly into it. The median nerve was found by an incision just in front of the elbow to the inner side of the bicipital fascia and was treated in the same way. The ulnar nerve was difficult to find, being buried under a large amount of fat and connective tissue, and a 1 per cent solution of cocaine was also injected into it. The amputation was then made, first leaving the thumb with a portion of the trapezium in place. The carpal bones were however found to be so much softened that the knife readily cut through them and on that account were removed. The thumb being so poorly supported was taken off. The skin flap which was abundant was then drawn over the bones with three interrupted sutures of silk worm gut. The incision in the upper arm was closed with interrupted sutures of fine silk. The patient made but very little complaint during the operation, so probably suffered but little as she was of a somewhat querulous nature.

She felt perfectly well till September when she began to have pain in

her left axilla at which time she noticed four small nodules. In the course of about a month these nodules broke down and ulcerated, the pain then becoming less. These ulcerated areas finally coalesced and eventually penetrated into the deeper tissues, forming a large sharply defined excavation.

Physical examination showed the patient to be considerably emaciated, and in the left axilla was seen a deep foul smelling ulcer with sharply defined edges. It was slightly oval in shape, being two inches long, one and one-half wide and three-quarters deep. The skin immediately surrounding the opening was smooth and shining. The cavity had irregularly eroded walls covered in many places by greenish and necrotic tissue. At the base of the cavity was a dense mass of grayish white tissue.

At the left wrist was a slight scar, the result of the previous amputation. It showed no general or local thickening nor any other peculiarities. The skin of the forearm appeared perfectly healthy, the muscles however were flabby and atrophic.

At times she has considerable pain in the forearm and it gets cold very readily, and is then followed by pain that extends to the shoulder. Occasionally has severe pain in the bones of the forearm.

She was operated upon on November 27th, 1905, at which time the ulcer with the adjacent tissue was removed. Adjoining this mass were several small but enlarged nodes. Disappearing into the tumor was a large nerve, about the size of a match stick. On careful sectioning it seemed to spread out and disappear into the new growth. Although the relations could not be well made out it seemed probable that the nerve was the median.

Microscopic findings. Portions of tissue were taken from various parts of the neoplasm, hardened in Zenker's and mounted in both celloidin and paraffin. One section included a portion of the skin as well as the edge of the ulcerated area. In it the surface epithelium gradually thickens and send prolongations down into the deeper tissues. Numerous irregular nests of abnormal cells are present and are surrounded by a well marked stroma of adult fibrous connective tissue. The cells vary greatly in size, the nuclei are vesicular, differ in shape and size and many show well marked mitotic figures. In many of the epithelial nests the cells are concentrically arranged and show marked keratin degeneration. Round cell infiltration is well marked. Diagnosis, secondary squamous epithelioma.

A second specimen taken from the base of the ulceration shows similar malignant conditions. In addition there is found a portion of nerve disappearing into the tumor mass.

In a third specimen a very interesting condition was found. The nerve that was found surrounded by the tumor mass has been separated into smaller bundles by neoplastic cells that have penetrated its covering. The

relations of the nerve have been much disturbed as is shown by the various planes through which the bundles have been divided; some longitudinally, others transversely and some obliquely.

One of these bundles has a crescentic shaped mass of tumor cells lying between the perineurium and the nerve itself. Toward the middle of the crescent the cells are seen to be no longer confined but have penetrated between the nerve fibres. In a few places the tumor cells can be discerned lying in the endoneurium between the individual fibres. This mass of cells is separated from an adjoining collection by a very narrow band of fibrous connective tissue. In many of the nerve fibres the myelin sheath is much increased in thickness and is very granular and the axis cylinder in some is much swollen, in which case it has lost its power to take up the stain. In other portions of the nerve bundles can be seen cells that resemble in every way those found in the neoplastic tissue. The invasion in this case has been both peri and endoneural, the first, however, predominating. Various sections of the nerve itself at different levels were examined but no tumor cells could be found. Unfortunately portions of the nerve below the point of operation could not very well be procured.

In this case it would seem quite evident that the pain and ulceration were both due to pressure and to trophic disturbances.

The condition of the skin at the edge of the ulceration was also of interest. The secondary growth took place within the axillary nodes and then extended outward finally involving the skin. Instead of the squamous epithelium undergoing atrophy it has taken on a malignant degeneration. Processes of cells dip down into the subcutaneous tissue, the basement membrane is lost and a picture is given resembling a primary squamous epithelioma with extension. It would appear as if the secondary tumor in its growth had by proximity caused the epithelium of the skin to take on a malignant change.

EDITORIAL COMMENT.

THE NEED OF INDUSTRIAL SCHOOLS FOR THE BLIND.

A recent number of "Charities and the Commons" (February 3, 1906) is devoted to the consideration of a neglected field in the education of the blind. The education of those born blind and those who become blind in earliest childhood has engaged the attention of philanthropists largely to the exclusion of any serious effort toward providing instruction for those who become blind in adult life. Today, practically every state in the Union has its schools for blind children. Although it has been universally recognized since the pioneer work of Howe that there are two distinct problems in the education of the blind—the one purely scholastic, the other industrial—it is, nevertheless, true that there are today 4,500 blind children being educated and only a few men and women over twenty receiving industrial training. The neglect of the industrial aspect must be largely ascribed to the failure of the public to recognize the fact that 75 per cent of the blind in this country are above the usual age limit (20 years) of admission to existing schools. In default of industrial schools a large proportion of this class will inevitably lapse into apathy, mendicancy, or become a charge upon the state.

In 1903 New York and Massachusetts appointed commissions to investigate the conditions and needs of the adult blind. The reports of these bodies recently submitted, are strikingly similar in many respects. It is recommended, first, that the state maintain a register of all the blind, including, among other data, their age and the age when they became blind; second, that the scholastic institutions dealing with blind youths should prepare them more concretely for after life; third, that agencies be devised to train industrially those who become blind after maturity. These investigations have shown that it is not lack of sight but rather the insulation of the blind as members of economic society that should be impressed upon the mind of the community.

The old attitude of the public toward the blind must be changed. It must be neither sentimental nor pathological, but simply sociological. It must be an attitude of sanity and fellowship. "Help the blind to help themselves": such are Helen Keller's words. The man suddenly bereft of sight must be readjusted to his environment. Whether he will experience the blessedness of work which leads to contentment, or by idleness enforced, lapse into black despair, will depend partly upon himself, but more on the inspiration given him from outside. Heretofore his groping hands have supplicated us in vain.

The cry of these people is not for alms but for work. There is not one who does not dread dependence upon the family or the state. The knowledge of a trade whereby he may earn his own livelihood is the boon of all others that he craves at the hands of his fellows. Shall we continue to turn a deaf ear to his appeal?

Granted that simple humanity demands industrial schools for the blind, it must also be conceded that they are needed on the ground of economy

to the state. The cost of training an individual to such proficiency in a trade that he may become largely if not altogether self-supporting—say \$300—is about the same as the cost of maintaining him a single year in a poor house. If, without training, a man of thirty becomes a charge upon the state and lives to the age of sixty, his maintenance will have cost the state thirty times three hundred dollars. When our state legislatures are appealed to it is probable that this aspect of the question will have the greater influence in securing appropriations.

UNDRAWN POULTRY A MENACE TO HEALTH.

In a recent number of *Dietetic and Hygienic Gazette* attention was called to the vicious custom of marketing undrawn poultry, and offering for sale, and selling, undrawn poultry which had been in cold storage for weeks or months. This condition of affairs can be easily remedied if the profession will interest themselves in the matter to the extent of using their personal influence to compel all dealers to dress all fowl and small animals, like rabbits, immediately after being killed, and remove all entrails. The same precaution should be observed with fresh fish, as ptomaines develop quite as rapidly in fish and are quite as deadly as ptomaines in fowl.

Physicians in the smaller towns and cities can do splendid work along this line by calling attention to the great dangers from undrawn poultry, and every physician who acts as a health officer can compel dealers to draw poultry, or if existing laws are insufficient to cover the case, secure the passage of an ordinance covering the case.

The last legislature of Minnesota passed a law providing for drawing poultry. It is found in chapter 96, penal code, section 7½. It says:

“Every person who shall offer or expose for sale at retail, for human food, at any public market, store, shop or house, or in or about any street or other public place, any domestic or wild fowls, or any slaughtered rabbits, squirrels or other small animals, wild or tame, unless the entrails, crops and other offensive parts are properly drawn and removed, shall be guilty of a misdemeanor.”

It makes no reference to game birds, as under the game laws they cannot be sold. This law also omits fish.

This law for some unknown reason fails to reach the case of cold storage, as it expressly says “every person who shall offer or expose for sale *at retail*,” etc. This permits the commission men and cold storage people to keep the fowl with entrails intact as long as they like, provided the retailer removes the entrails as soon as he offers them for sale. The law should read that all fowl must be drawn and thoroughly cleansed as soon as killed. In no other way can the vicious practice of cold storage houses be stopped.

Ptomaine poisoning from the ingestion of tainted food causes frequent localized epidemics of diarrhœa, and where diarrhœa does not quickly supervene and assist in carrying off the poison, death can and does frequently occur before the true cause is ascertained and effective measures taken to eliminate and counteract the poison.

MEDICAL AND SURGICAL PROGRESS.

INTERNAL MEDICINE.

IN CHARGE OF

JESSE S. MYER, M. D.

THE RADICAL REMOVAL OF CANCER OF THE STOMACH.—The Mayos (*New York State Jl. of Med.* Jan. 1906) make the statement that there is no truthfully recorded case of a cancer of the stomach cured by medical means, but that these cases are nevertheless treated by medical men and necessarily result in 100 per cent mortality. Cancer of the stomach is the most frequent form found in the human body, at least thirty per cent of the total, a tremendous sacrifice of human life almost without an effort at cure. They blame this state of affairs upon the past high mortality of radical excision and the difficulty of early diagnosis. They maintain, however, that the improved technique of the past few years has lowered this mortality to less than 10 per cent. They report 81 gastric resections with a mortality of 14.5 per cent. Thirty-four of these were operated upon within the last thirty months with a mortality of eight per cent. Of the total number, five failed to live six months after operation, thirty-eight cases lived six months to a year, twenty-one from one to two years, ten from two to three years, four from three to four years, and one is alive and well after four years and ten months. They consider the clinical history and symptoms of the greatest value in early diagnosis. At best, however, all known means of diagnosis merely give rise to a suspicion, and if we cannot disprove it, exploratory operation is called for.

Deaver, in the discussion of this paper, urges upon the internist the importance of familiarizing himself with the pathology of the living being in the operating room. He, too, lays greatest stress upon the symptomatology and physical examination, and less upon laboratory methods, for, as he says, hydrochloric acid may be present in cancer of the stomach and lactic acid present in diseases other than cancer. In a choice between symptoms and physical signs he relies more upon the former than upon the results of the physical examination. There have been so many cases in which a palpable tumor disappeared after stomach rest had been obtained by gastroenterostomy, that he has found it well nigh impossible to diagnose unerringly a tumor as malignant until either the constitutional symptoms were well advanced or the abdomen was opened. The character of the vomitus and progressive emaciation are to be most relied upon when the case is at all advanced. Emaciation, however, is not to be accepted merely on the patient's word. The statistics from the clinics of Krœnlein and Mikulicz show that patients who have undergone an exploratory laparotomy in which no further operative treatment was possible, actually lived longer than did those whose disease was so far advanced as to make even an exploration unjustifiable. For this and

other reasons, Deaver is a firm believer in exploratory laparotomies where justifiable indications are present. He believes that there is too much surgery being done upon the stomach at present. He considers indigestion as belonging first to the internist and if through a rational treatment persistent symptoms are not relieved, surgical investigation to discover and relieve the physical conditions is not only justifiable but indicated. He believes that every case of gastric indigestion not cured by rational treatment will be found to be due to lesions of the gall bladder, duodenum, pancreas or the stomach itself.

[The above remarks by some of our most competent surgeons show the trend of modern gastric surgery. It is seldom, however, that we hear an internist expressing such unqualified opinions as these with reference to diseases of the stomach. I firmly believe, however, that while they go too far in maintaining that every case of persistent indigestion should be subjected to an exploratory operation if it does not yield to rational medical treatment, that we internists are often guilty of treating gastric symptoms as primary stomach troubles, when in fact they are due to causes in other organs, which causes may be removed only through surgical interference. I think, however, that the chief danger in the acceptance of this view is that the surgeon will be too prone to assume that a rational treatment of the case has been carried out merely upon the statement of the physician who brings the case to him. I have observed this time and again when I felt that a *rational treatment* had not been carried out. A rational treatment of the diseases of the gastrointestinal tract presupposes first of all a profound knowledge of the physiology of the gastrointestinal tract, a large knowledge of dietetics and a little knowledge, at least, of *materia medica*. If surgeons who have had a vast experience in the physical examination of abdominal cases and the opportunity to corroborate their findings through laparotomy, would make it a rule to place their stomach cases under the careful observation of a careful observer for a period of at least two weeks before subjecting them to the knife, I believe we will have attained the desired end in the surgical treatment of diseases of the stomach. In this way and only in this way can the abuse of gastric surgery be prevented. This rule should be broken only when the symptoms are so definite as to leave no doubt as to the diagnosis, or when the surgeon feels *fully assured* that the patient in question has received *prolonged rational treatment*.—Ed.]

A NEW METHOD OF TESTING THE FUNCTIONS OF THE DIGESTIVE APPARATUS.—Einhorn (*Medical Record*, Feb. 10, 1906) conceived the plan of attaching solid food stuffs to porcelain beads and then to have them pass through the stomach and bowel in order to see what remained attached to the tube. It is self evident that a substance which is entirely digestible will disappear, whereas indigestible substances will be found in the feces attached to the beads. Through this means he was able to determine how the various food stuffs behaved in the stomach and bowel of apparently healthy persons. To test the work of the stomach alone, the beads, with the food substances attached, were tied to a silk thread 50 cm. long. The beads were swallowed and exposed to the action of the gastric juice four to six hours and then withdrawn. At-

tached to the beads were catgut and meat, raw tendon, raw chicken skin, raw potato, etc. These experiments in healthy people show that both catgut and fish bones are digested in the stomach, whereas boiled or raw meat, raw chicken skin, and raw as well as boiled potatoes do not disappear altogether in this organ. Raw muscle fibre and chicken skin disappear in the intestines. Tendon, however, remains undigested. Raw potatoes sometimes disappear entirely, sometimes pass through the intestines unchanged. He also carried out a series of experiments testing the gastric functions according to the methods described by Ogata, Schmidt, Sahli (These tests were referred to in the February number of the *INTERSTATE* and need not be repeated here).

THE DIAGNOSIS OF STONES IN THE COMMON DUCT.—Ehret (*Muench. Med. Wochen.* Jan. 16, 1906).—For an absolute diagnosis of stones in the common duct, it is important first of all to have made an absolute diagnosis of cholelithiasis, and secondly to have noted that the stool of the patient in question has at least contained bile pigments from time to time. This last is not absolutely necessary, for cases have been noted in which the feces have been entirely free from bile pigments for a very long period of time and choledochus stones have been demonstrated. The temperature curve in these cases is quite characteristic. The temperature is normal for a long period of time with paroxysms of fever developing at periods varying from once a week to once in twelve weeks. The temperature frequently rises 41° C. and through a crisis returns in a few days to the normal. Together with this periodical temperature there is regularly an icterus varying from a very mild to a very severe type. Even after the temperature returns to the normal the icterus will continue in a very mild degree for a very long period of time. With the elevation of temperature this mild degree of icterus again becomes very severe. Unlike gall-stone disease in general, there is an absence of pain and tenderness, and this is quite as characteristic as the symptoms just mentioned. The author maintains, therefore, that cases presenting paroxysmal elevations of temperature, regularly associated with icterus, in the absence of pain, unquestionably have stones in the common duct.

GANGRENE OF THE GALL BLADDER; RUPTURE OF THE COMMON BILE DUCT WITH A NEW SIGN.—Ransohoff (*Jl. Am. Med. Assn.* Feb. 10, 1906) recites the history of two cases of gangrene of the gall bladder and rupture of the common duct and points out a very interesting symptom which to his knowledge has never been observed before. This is the localized jaundice about the umbilicus, observed in one of these cases. Although a single case does not warrant the assumption that something entirely new has been observed, the author believes that further observation will give to this localized jaundice some value as a sign of free bile in the peritoneal cavity. In the case presented this feature gained in interest as the staining of the subperitoneal fat with bile was observed through the incision in the abdominal wall. It makes itself manifest in the integument of the navel because this part is thinner than the rest of the abdominal wall. It is possible too, that by reason of the anatomical relations of the round ligament of the liver to the transverse fissure that

there is a retrograde flow of bile through the lymphatics toward the navel just as the caput Medusæ is produced in cirrhosis.

OBSERVATIONS ON THE TREATMENT OF ACUTE PERITYPHLITIS.—Groscher (*Muenschner Med. Woch.* Jan. 23) maintains that it is not possible through a clinical examination to make a definite anatomical diagnosis as to the condition of the appendix and the peritoneum about it, and recommends in every serious case, the performance of immediate operation on the first, or at the latest, the second day. He believes that the early operation presents fewer dangers than are met with even after a delay of three days. Even the lightest cases should be under most careful observation with all preparations made to operate if the recovery is delayed, or for any reason the condition becomes worse. One unfavorable symptom should carry more weight than ten favorable ones. In all cases food by the mouth should be stopped at once, purgatives by all means avoided, and opium given only after definite conclusions have been reached as to the condition of the patient.

MOSQUITO WORK IN RELATION TO YELLOW FEVER ON THE ISTHMUS OF PANAMA.—Gorgas (*Jl. Am. Med. Assn.*, Feb. 3, 1906) points out the great mortality on the Isthmus of Panama during the French occupation and compares these figures with the ones that have been attained during American occupation of the canal zone. The results of his work have been the apparent elimination of yellow fever from the zone. In June they had sixty-seven cases, in July forty cases, in August twenty-seven cases, in September seven cases, in October three cases and none in November and in December. Of course it is too early to say that yellow fever has been entirely eradicated from the Isthmus. This cannot be affirmed with any certainty until the full life of the female stegomyia has been passed. He has seen them live in captivity for 150 days and believes therefore that at least two months will be necessary to determine whether or not yellow fever has been entirely eliminated from the Isthmus.

PATHOLOGY AND BACTERIOLOGY

IN CHARGE OF

CARL FISCH, M. D.

ABOUT THE RECOVERY OF TOXIN FROM ITS ANTITOXIN COMPOUND. J. Morgenroth (*Berl. Klin. Woch.* 1905, No. 50.)—In view of the proclivity, at this time, to call Ehrlich's theory a chimera, and to replace it by so far altogether hazy and uncertain analogies with certain coloidal reactions, Morgenroth's paper adds a point of immense value to the enormous material accumulated, only and only understandable after Ehrlich's ideas. The more or less stereochemic nature of the latter has been attacked in many directions, foremost among them the absence of a proof that from the reaction products the composing substances, anti-toxin and toxin for instance, can be recovered. The author has pub-

lished experiments that most clearly demonstrate this possibility and at the same time demonstrate that so far the limit of the methods used for this problem was the limitation for the possibility of success. It will be impossible to give details of his experiments that were made with snake-venom and lecithin. His conclusions are these:

By watery HCl at a moderate temperature cobra-hemolysin can be changed into a modification that does not possess any more the capacity to bind the specific antitoxin produced by the injection with the genuine toxin. It has, however, still the quality to combine with lecithin to a lecithid. By neutralization, the modification returns to the original condition. This modification obtains also when the toxin is already combined with antitoxin. Consequently, on the addition of HCl, a splitting of the toxin-antitoxin combination is seen, that otherwise is irreversible. In such solutions, after neutralization, the toxin is present in active form at the side of antitoxin. In this way, even after a long time, it is possible to recover from neutralized or hyperneutralized toxin-antitoxin mixtures the toxin quantitatively, and the same the antitoxin. The quantitative recovery of the original toxin is easily obtained, utilizing the resistance to heat of the toxin modification (after Keyes and Sachs), thus by heating the antitoxin-toxin mixture destroying the split off antitoxin. After the neutralization, the total quantity of toxin with its specific qualities can be demonstrated by experiment.

A complete reversibility, therefore; a final denegation of the attempts to explain immunity reactions on a purely physico-chemical basis. In view of the attempts of making them simply colloidal phenomena, I may be allowed to quote Morgenroth's words.

"It would in my opinion be a great disadvantage for the exploration of immunity, if Ehrlich's principle, basing on analogy with stereo-chemistry, theoretically so well based, would be left behind for some, at the present, at least, purely formal analogies, that some phenomena show with phenomena known in the colloid chemistry, just now in statu nasendi. The stereo-chemic interpretation fully corresponds to the peculiar reaction of the immune substances, approaches us to the problem of the specificity of the immune bodies and offers to us, as shown by the production of the cobra-lethacid by Keyes, at least the principles of the chemical constitution of the immune substances.

EXPERIMENTAL CIRRHOSIS OF THE LIVER.—R. M. Pearce (*The Jl. of Exp. Medic.* Vol. 8, No. 1).—The interesting results of Pearce are summarized in the following words: The reparative process, which follows the widespread necrosis of the dog's liver caused by the injection of hæmagglutinative serum constitutes a chronic interstitial hepatitis of definite and constant character. This is not only a new type of experimental hepatic lesion, but is more definitely a cirrhosis, than in any other experimental lesion hitherto described. It is of importance in explaining the histogenesis of cirrhosis, and incidentally various repair processes in the liver; but it does not aid in the elucidation of the etiology of cirrhosis in man, nor does it explain the peculiar arrangement of the new connective tissue in any form of human cirrhosis, except, possibly, that associated with chronic passive congestion. It definitely demon-

strates, however, that cirrhosis may follow extensive primary destructive lesions, a view not yet fully accepted, and supports the contention of Kretz that cirrhosis is essentially a reparative process.

TODAY'S STATUS IN THE FIGHT AGAINST TUBERCULOSIS.—R. Koch (*Deutsche Med. Woch.* 1906. No. 3).—It is not the reviewer's intention to abstract Koch's publication. Any abstract would do injustice to it in its lapidary structure and architectonic symmetry. The words of Koch incorporate the essential results that the endless attempts to compass tuberculous infection so far have yielded. In them there is combined a likewise authoritative estimation of the work done in pathologic, clinical and therapeutic, as well as in preventive studies. If we say that Koch's words are based on his assertion of the essential and most important factor, the human tubercle bacilli, we must not forget that the last year has brought final settlement about the correctness of it, in spite of the half way condescendence to the opposite opinion. Today, the human bacillus is the only one that positively must be in the first place attacked, not the bovine, or we ought to take the same preventive procedures against the organisms of actinomycosis or other chronic infectious diseases. The ways in which this is to be done are outlined very plainly in the publication and ought to be seriously considered by everyone dealing with the problem of diminution of tuberculous disease. That Koch has allowed certain merit to the sanitarium movement, is a connivance to the modern sentimental trend of mind. He clearly suggests that the attack must begin much earlier, before sanitarium treatment appears indicated at the present time. Only by preventing the rising of an open tuberculosis a final result will be obtained, and this is the gist of Koch's work and endeavor.

CYTOTOXIC SERUM PRODUCED BY THE INJECTION OF NUCLEO-ALBUMENS.—S. P. Beebe (*The Jr. of Exp. Med.* Vol. 7, No. 6).—The specificity of antisera produced by the introduction of body-cells into an individual of another species has come into disrepute by investigations that showed that such sera have mostly not more effect on the organ by the injection of cells of which they were produced, than on other organs. The work of Pearce, especially, has done a great deal to prevent further study of the problem, although, *a priori*, it seems to be of specially great importance for many questions. In experimenting in this direction, the mistake must have been that a specifically functioning cell must in toto produce antibodies of specific character. That this is a mistake has been known for a long time; we have known that antispermatozoic serum is not only spermatolytic, but also hemolytic, agglutinating and precipitating, and the same obtain for all the other specific immunity-reactions. The mistake was made by assuming not only the biologic, but also the total chemical and physical difference of a specific cell from cells of another specificity. It was forgotten that the cell is not an independent element, but only an integral part or portion of the whole; that its life must be based on the same principles on which that of the whole is based. In other words, the substratum making possible the life of a specific cell must be the same as that of the whole organism.

From this it results that every cell in so-called immunity-reactions must to a degree react in an identical way; according to the degree of complexity of differentiation the degree of reaction may differ. But the basis of the life of every cell must show itself by such a reaction. It may be overshadowed by the reaction of an overspecialized function of its substance, but it must be demonstrable. And this is so, in reality. So far, the results, in obtaining objective proof for this truth, have been hampered by many experimental difficulties. Beebe has attacked the question in starting from the at least morphologically most probable possibility, that the functional differences of various forms of cells are inherent not in the cell as such, but in those components called nucleoproteids. The thought, that since we believe that nuclei are the dominating factors in cell function and life, and that to a great excess they always contain more nucleoproteids than other constituent parts, lead to the question whether the difference in function would lead to a difference in constitution and, therefore, to a difference in immunity-reactions. So from liver, kidney and pancreas the nucleoproteids were isolated and utilized for injection into animals. The sera thus produced were found specific in action on those tissues, from the nucleoproteid of which immune substances were produced by the injections. For nephrotoxin, an absolute specificity in this way could be demonstrated; in a less conspicuous manner for hepatotoxin and pancreatotoxin. Beebe's investigations have brought us close to an insight of the complexity of the processes obtaining in immunity reactions. They have on the other hand shown the wisdom of Ehrlich and his followers in limiting their researches to single phases that could be controlled. They call a serum hemolytic only, while they well know that many other just as specific qualities are contained in it.

INVESTIGATIONS ABOUT FRAMBOESIA TROPICA (Yaws).—Aldo Castellani (*British Med. Jour.* 1905, Nov. 18. *Deutsch. Med. Woch.* 1906. No. 4).—Castellani has found great numbers of a spirochæte in eleven out of fourteen cases of yaws, that in all respects highly resembles the form discovered by Schaudinn in syphilis. They are present in the primary lesions as well as in the secondary skin-manifestations. In the author's opinion the organism cannot be differentiated from the spirochæte pallida of Schaudinn, and, since he believes that Framboesia is different from syphilis, he asserts that the yaws spirochæte is biologically different from Schaudinn's. He calls it spirochæte pertenuis or pallidula. The observation is of exceeding interest and importance, if we remember that the old discussion, whether yaws is identical with syphilis, only a tropical modification of it, or whether it has no relation to it, has not yet been settled. As to the clinical appearance, all of the syphilitic phenomena, down to tertiary lesions are present. The way of infection and the distribution of the lesions is nearly identical. Histologically the latter, it must be said, vary greatly from those of syphilis. In spite of this, the clinical relationship is so near that the thought of a close etiological relationship, too, has never disappeared. In the findings of a characteristic organism in yaws, that here is found just as exclusively as Schaudinn's spirochæte in syphilis, and the apparent close resemblance of both organisms, are two points that necessarily form a very stringent, although circumstantial evidence for their etilogic rôle.

EXPERIMENTS ON THE INOCULATION OF MONKEYS WITH SYPHILIS.—A. Neisser. (*Deutsch. Med. Woch.* 1906. No. 2 and 3).—Neisser's work, carried on last year in Batavia, is the beginning of an experimental period of study into the nature of syphilis, made possible by Metchnikoff's and Roux's and Neisser's own preliminary work about two years ago. The results already obtained are very important; their importance lies, however, mainly in the suggestiveness with which they point to the further course of investigation to be taken. They can be detailed here only in great shortness: The period of incubation in monkeys lasts mostly three to five weeks. For inoculation, deep scarifications were made, into which the material was rubbed. Greater certainty of results obtained for material from florid and fresh stages of the disease. Primary glands, condylomata, mucous patches and papules served best. In one case infection was obtained by material from a tertian lesion. Inoculation with blood or serum did not succeed. Of internal organs the spleen, bone-marrow, lymphatic glands and testicles caused infection; negative results followed the use of the spinal cord, ovaries, liver, lung, kidney, suprarenals and muscles. It was impossible to demonstrate different degrees of virulence. It seemed in some cases that by the continued passage through a series of monkeys the virulence was rather increased. Higher monkeys are more susceptible than the lower ones; in the latter, infection is only possible by way of the genitalia or the eyebrows. In the higher monkeys, the general condition was greatly interfered with; primary swellings of lymphatics were very conspicuous; general papulous eruptions were seen in a number of gibbons. Localized eruptions and local returns were frequently observed.

It is a very interesting fact that the author never succeeded in causing infection by subcutaneous inoculation. It seems that a healthy organism destroys the virus in the subcutaneous connective tissue. Neisser, however, has been led to believe that it will be possible to increase the production of antibodies in an infected organism by subcutaneous injections of the virus. In view of the skin immunity, he assumes that immunity may exist against the own parasites, but not against those of other individuals. A general rule for the time in which immunity is established cannot be given. The time in which the virus is generally disseminated over the organism was found to be varying, but not longer than fifty-four days; the experimental data were obtained by inoculation of the internal organs, as above mentioned. It is very important that the administration of mercury did not influence either the development of the primary effects nor the generalization of the virus. As to immunization, Neisser calls attention to the fact that the way of causing attenuation of the virus by passage through lower monkeys does not appear very hopeful, as he has shown that even in them generalization occurs. It must not be forgotten, however, that the organs of lower monkeys cause infection much less frequently than those of anthropoids. Only the testicle here forms an exception and seems to retain the virus even more tenaciously than the lymphatic glands. Neisser's search for spirochæte pallida was not always successful; he himself admits, however, that he did not give much attention to it on account of lack of time, and he pronounces the etiologic quality of the spirochæte as highly probable.

DIAGNOSIS.

IN CHARGE OF

A. E. TAUSSIG, M. D.

THE DIFFERENTIAL DIAGNOSIS OF HAY FEVER ASTHMA.—A. Wolff-Eisner (*Deutsch. med. Wochenschr.* 1906, No. 4).—Asthma due to hay fever can usually be differentiated from other forms of asthma by means of the anamnesis. Hay fever patients are usually attacked by their disease at a certain definite date, corresponding to the flowering of rye and other grasses in their locality. The hay fever ceases as soon as the period of flowering is over and does not recur until the following year. The differential diagnosis is often of great importance, not only as regards the local and general treatment, but especially as regards sending such patients away. Localities that would be particularly suitable for patients with bronchial asthma might be the worst possible for those with hay fever, and the reverse. In cases in which the anamnesis and the physical examination do not permit a definite diagnosis, the writer advises the following procedure: Pollen of rye, grasses, corn, etc. (in this country especially rag-weed) are triturated with physiologic saline solution, centrifugated and the clear liquid preserved for future use. A few drops instilled into the eye of an individual not subject to hay fever produces no effect. If the patient, however, be a hay fever subject, a typical conjunctival injection with swelling and much discomfort promptly results. There may even occur a coryza with sneezing and asthmatic attacks. All of these untoward symptoms can be cut short by the subsequent instillation or insufflation of pollantin. In this manner a definite diagnosis is always rendered possible. Dunbar has advocated a similar use of his "pollen-toxin." The latter is an extract of pollen grains, purified by precipitation with ammonium sulphate. According to the writer, this method of preparing the toxin greatly diminishes its toxicity and leads to untrustworthy results. He states that only extracts of fresh pollen grains with physiologic salt solution should be used.

PECULIAR CELLS FOUND IN THE SPINAL FLUID IN A CASE OF ACUTE POLIOMYELITIS.—Ellermann (*Hospitalstid*, 1905, No. 47).—The microscopic examination of the fluid obtained by lumbar puncture is growing in importance in the diagnosis of all sorts of lesions of the central nervous system. In a case of acute poliomyelitis, the writer found in the centrifugated sediment of the spinal fluid on two occasions peculiar cells having a diameter of 15-24 micra, showing amœboid motion and unquestionably not leucocytes. He is inclined to consider them protozoa and believes the finding may have diagnostic significance.

A NEW METHOD OF ISOLATING TYPHOID BACILLI FROM THE BLOOD.—H. Conradi (*Deutsch. Med. Wochenschr.* 1906, No. 2).—Probably the earliest certain sign of typhoid fever is the presence of typhoid bacilli in the blood. The methods hitherto used for making blood cultures in this condition have suffered from the disadvantage that blood serum

kills off the typhoid bacilli very quickly. Accordingly it has been found necessary to withdraw by means of venesection 10 c. cm. or more of blood which must at once be diluted with many times its volume of bouillon or agar in order to diminish the antiseptic action of the serum. Recent bacteriologic findings have however shown that the unclotted blood has no such bacteriocidal power, the latter evidently being set free as the result of the clotting of the blood. Conradi has accordingly attempted to obviate the main difficulty in the making of blood cultures by preventing the coagulation of the blood withdrawn for examination. Two substances that have strong anti-coagulative power are bile and peptone. The following culture medium at once prevents clotting, forms a good soil for the growth of typhoid bacilli and hinders the growth of adventitious micro-organisms:

In 90 ccm. of fresh ox-gall, dissolve 10 g. peptone, add 100 per cent glycerin and sterilize two hours in steam. The unfiltered clear fluid is poured into sterile test-tubes with well fitting rubber stoppers, 2 to 3 cm. being placed in each. Before being used these tubes are once more sterilized for half an hour. Sterile capillary pipettes are also kept in readiness. When called to the patient, it is necessary to bring only one of the culture tubes, one of the pipettes and a blood lancet. The lobe of the patient's ear is carefully made sterile by means of soap and water and ether. A little of the culture medium is drawn up into the pipette, a fairly deep puncture made into the ear, a drop of blood sucked into the pipette where it at once mingles with the bile. The mixture is then blown into the culture tube and the procedure repeated as long as blood flows. It is usually possible to obtain one or two centimeters of blood from a single puncture. The quantities of blood and culture medium should bear the proportion of 1 to 3. The tube is then placed in the incubator and after 24 or 48 hours examined for the presence of typhoid bacilli in the usual manner.

By this method the writer has found in twenty-eight cases typhoid bacilli twenty-two times and paratyphoid bacilli six times. Negative results were obtained in about the same number of cases. The method as above described is thus unquestionably inferior to the methods hitherto in use and is advocated only as a makeshift in private practice where a venesection is impossible. A procedure which combines all the advantages of both methods consists in sowing 10 to 20 ccm. of blood, obtained by venesection, into a flask containing a sufficient amount of the above described bile culture medium.

THERAPEUTICS.

IN CHARGE OF

WALTER BAUMGARTEN, M. D.

THE DIETETIC TREATMENT OF ULCER OF THE STOMACH.—Senator (*Deutsch. med. Wochenschr.*, Jan. 18, 1906).—The insufficiency, from the standpoint of nutrition, of the usual Leube-Ziemssen diet in ulcer of the

stomach has given rise to experiments in diet which are less likely to produce, or at any rate will not foster the anemia and loss of weight which accompany many cases. Lenhartz, followed by Wirsing and Minkowski, suggested a diet which provided frequently administered small quantities of nutritious food, particularly rich in proteid which is capable of combining with the usually excessive hydrochloric acid, and thereby neutralizing its irritating effect upon the ulcer. It consists at first, of eggs in gradually increasing number, to which, in time, is added milk, then sugar, and finally scraped beef. Lenhartz begins with this semi-solid diet, without preliminary complete rest (starvation), rectal feeding or liquid diet. Senator thinks that a means can be found between these two extremes (the Leube-Ziemssen and the Lenhartz diets). He formulates the requisites of a diet in ulcer of the stomach under four headings 1. The food should not be bulky or heavy. 2. It should not act as an irritant, and, above all, not cause hemorrhage. 3. It should counteract the usual hyperacidity. 4. It should be easily digestible and yet be sufficiently nutritious. A diet meeting these requirements he thinks may be constructed of three substance as a basis, namely, gelatine, fat and sugar. Gelatine is not only a partial substitute for proteid, but may act locally upon the surface of the ulcer as a styptic. In addition to their nutritive value, both fat and sugar reduce the hypersecretion of hydrochloric acid and the fat acts as a protective and sedative to the ulcer. In early cases and after hemorrhage, Senator administers a dilute decoction of gelatine every one to two hours in dessertspoonful doses, more frequently in urgent cases. In addition fresh butter and cream should be given in small doses as such, so that in the first twenty-four hours 30 grams of butter and at least $\frac{1}{4}$ litre of cream are taken. A diet of this quantity will contain 900 to 1,000 calories—a great many more than either the Leube-Ziemssen or the Lenhartz diet affords in the early stages of the treatment. If no hemorrhage occurs after the beginning of this treatment, the quantity of food may be gradually increased, milk may be added to the diet, then scrambled eggs, etc.; while the gelatine may soon be dispensed with. Scraped beef may be used earlier than in any other diet. Senator emphasizes that in his experience this diet has been curative and at the same time afforded adequate nutrition.

PREPARATION OF A SERUM FOR THE TREATMENT OF EXOPHTHALMIC GOITRE.—S. P. Beebe (*Jl. Am. Med. Assn.*, Feb. 17, 1906).

THE TREATMENT OF EXOPHTHALMIC GOITRE BY A SPECIFIC SERUM.—Rogers (*Jl. Am. Med. Assn.*, Feb 17, 1906).—Beebe, at Rogers' suggestion, has produced an antiserum for exophthalmic goitre by isolating the nucleoproteids and globulins (thyreoglobulin) from the thyroid in cases of exophthalmic goitre, and injecting these in small and repeated doses into rabbits until at the end of five or six weeks an efficient serum was obtained. The isolated proteids were employed because it was found that the whole gland was not necessary. The nucleoproteids were used for the purpose of producing some cytolytic effect, the globulins for the production of antitoxic properties in the serum. The rabbits were given injections intraperitoneally, of the mixed proteids at intervals of five days and bled from the carotid on the eighth day after the last injection.

Four antisera were prepared, one from the freshly precipitated proteids, one from the dried proteids when four months old, one when the proteids were five months old, and one from the normal human thyroid. The first serum proved to be the best; the last (normal thyroid) was wholly without effect. Rogers thinks that the decreasing effectiveness of the first three sera for producing permanent results is due to a deterioration of the cytolytic element, that is of the nucleoproteids, which is similar to the experience with bactericidal sera. In the second and third sera the purely antitoxic properties predominated.

The effective sera were used in ten cases of exophthalmic goitre, of which three were permanently cured with the disappearance of all symptoms of the exophthalmus and of the goitre; three were rescued from a critical condition and were approaching a recovery, and four were more or less improved. The serum produced no effect until the end of twenty-four hours when the subjective symptoms began to improve. The doses used were 5, 10 and 15 minims of the strongest serum, injected subcutaneously every other day. The weaker sera were used in larger quantities. On the fourth or fifth day a severe erysipelatous erythema developed about the points of injection, and great rapidity and irregularity of the heart. The permanency of the cure seems to be in proportion of the severity of the delayed reaction.

SURGERY.

IN CHARGE OF

WILLARD BARTLETT, M. D.

ON PRESERVATION OF THE NERVE SUPPLY TO THE BROW, IN THE OPERATIVE APPROACH TO THE GASSERIAN GANGLION.—Harvey Cushing (*Annals of Surgery*, January, 1906).—The proposition embodied in this article supplements the author's already known technique, which has simplified what was formerly considered the most formidable of surgical operations. Dr. Cushing has not been content with lessening the dangers attending upon this procedure, but now advises refinement in the technique, which is intended to improve our cosmetic results. In five of his cases, he found that it is possible to prevent cutting the branch of the facial nerve in question, by simply making the anterior limb of his well-known incision a little shorter than was formerly done. At the same time, this leaves less of a scar outside the hair line, and does not seriously embarrass the operator, as far as lessening the size of his field is concerned.

CONCERNING THE BILIARY PASSAGES.—Hartmann (*Bulletin et Mem. de la Soc. de Chir. de Paris*, January 16, 1906).—This well-known surgeon calls attention to the correct explanation of why it is that a stone in the common duct leads to contraction of the gall bladder, while a new growth compressing that duct causes the dilation of the bladder. The key to the situation leads to the fact that inflammatory changes in the wall of the gall bladder, leading to sclerosis, are a common accompaniment

of stone obstruction, whereas they are usually not present when a tumor obstructs the duct. It is usually an inflammatory change in the wall of the gall bladder which leads to the formation of the stone within the same, and this usually slips down into the duct and obstructs at some later period. Of course, there may be exceptional cases in which the two diseases go hand in hand. On the other hand a stone situated in the cystic duct usually leads to an immense dilation of the gall bladder. The pressure exerted overcoming any tendency to a sclerotic change in the wall of this viscus.

COMPLETE SUTURE, WITHOUT DRAINAGE, IN EARLY OPERATIONS FOR APPENDICITIS.—Borelius (*Zent. fuer Chir.*, No. 4, 1906).—In very many cases the abdomen can be just as well closed without drainage as not. This is more true the earlier one operates because at an early period the appendix is usually not perforated, and there is little or no infectious matter free in the peritoneal cavity. It does not matter if there is fibrin on the peritoneum, nor, indeed, does a serous exudate alone demand drainage. In sixteen out of forty-three early acute cases, the author closed the abdomen completely. They all healed perfectly and left the clinic on the seventeenth day. The average time that patients treated by drainage have remained in the hospital is thirty-eight days, consequently, one sees what gain is expressed in the author's proposition. He looks for the appendix and tries to remove it in absolutely every instance.

THE MANAGEMENT OF HOSPITALS.—Ochsner (*Lancet-Clinic*, January 27, 1906).—When a noted surgeon has devoted the amount of attention to hospitals which Dr. Ochsner is known to have done, then an article on this subject from his pen can hardly fail to attract attention and interest. He handles without gloves, the problems presented and makes many statements which cannot fail to interest those who have given little time to the consideration of this matter. He says that a large hospital can be well built for about one thousand dollars per bed, although some, which do no better work, have cost ten times as much. It costs twice as much to run one hospital as it does another, without increasing, at all, the efficiency of the former. The same business skill which is required to make a factory self supporting, should be given to the management of a large hospital, although this is rarely the case. Our hospitals should be so managed as to preserve the health and the lives of those who are of the greatest value to the community. The staff should not be chosen on account of political or church influence, nor should a man be placed on the staff of any hospital who will not give his sole attention to that one institution.

Women's Auxiliary Boards are usually a nuisance and interfere with the workings of the hospital machinery. Dr. Ochsner's "Diagram of Authority" is of value and deserves a careful study. The proper men for a hospital staff are those who have had a hospital training as assistants, this being the plan employed in choosing such individuals abroad, although it has not been done here. Politics, church and family influence have been largely the governing factors.

INTERNAL HERNIAE, ESPECIALLY THOSE OF THE FORAMEN OF WINSLOW.—Delkeskamp. (*Beit. zur Klin. Chir.*, Bd. XLVII, Heft 3).—This article embodies the report of the case of a woman twenty-two years of age, who was suddenly seized with colicky pain in the upper abdomen. She commenced to vomit, bowels refused to move, and remained in this condition for six days, at the expiration of which time she was brought into the clinic. Prof. Garre operated upon her, and found the large intestine greatly distended in its proximal portion, whereas the sigmoid was empty. The part of the colon lying between these two points had slipped through the foramen of Winslow and became incarcerated. A very ingenious means of returning this bowel to the general cavity was followed. Garre simply pressed the contents of the displaced portion out into the rest of the bowel, whereupon he was able to replace it.

Thirteen of these cases were found by the author in the literature, the one which he describes having made a very prompt surgical recovery.

AN ANOMALY OF THE DUODENUM, RESULTING IN DEATH AFTER GASTRO-ENTEROSTOMY.—James G. Mumford (*Annals of Surgery*, January, 1906).—This extremely interesting case represents one of the accidents which may complicate the most modern form of gastro-enterostomy. The short loop posterior operation had been done, and the next morning the patient assured Dr. Mumford that he felt more comfortable than he had done for years. The appetite rapidly returned, and the amount of nourishment was increased as conditions seemed to demand, until the fifth day, when suddenly there was a violent attack of abdominal pain, with profound collapse. A few hours later the patient died.

At the post mortem, the abdominal cavity was found full of stomach contents, the anastomosis having given way. As long as the stomach had remained dilated, the attached intestine remained in good position, but as soon as the stomach drained properly, it retracted so much that it placed the short loop on such a stretch that the sutures gave way, with the result just mentioned. The most interesting thing about this case is that the ligament of Treitz sprang from the right, instead of from the left crus of the diaphragm. This, of course, served in part to explain the accident which caused the patient's death.

ORTHOPEDICS.

IN CHARGE OF

NATHANIEL ALLISON, M. D.

USE OF TRACTION IN HIP DISEASE.—Bradford (*Amer. Jour. of Orth. Surg.*, January, 1906).—The arguments presented in this paper, which are made to show the value of traction in the treatment of hip disease, are as follows: An examination of all the pathological specimens of hip disease gives evidence of pressure crowding the head of the femur against the acetabulum. Patients suffering from hip disease in an acute stage have

an exaggerated muscular irritability, or state of muscular spasm, which causes this crowding. Bone that is disorganized by ostitis will not heal if violence of frequent contusion, or the crowding of one inflamed surface against another, is permitted. In the treatment of hip disease, the force which will counteract muscular spasm, and draw the head of the femur away from the acetabulum, favors correction, prevents deformity, and produces more rapid healing in the diseased bone. Experiment and skiagraphic evidence both demonstrate that a traction force may be applied, which will not only entirely overcome the spasm of the muscles about the hip, but which will also draw the head of the femur away from the acetabulum.

Traction is not needed during the whole period necessary for the treatment of hip disease, but is only needed in the stage of active muscular spasm. During the ulcerative stage, traction should be supplemented with fixation. Practical experience for many years in the larger orthopedic clinics in the United States has demonstrated the value of these views on the necessity of traction, as presented by Drs. Taylor and Sayre. No better proof could be furnished of the advantage of the traction method of treatment in hip disease thoroughly applied than is seen in the records of over 3,400 cases of hip disease carefully observed during the last thirty years at the Boston Children's Hospital.

Considering the contractile power of muscle, and the fact that the hip joint is surrounded by a group of strong muscles, it seems no other arguments need be presented to prove the injurious effect of exaggerated articular pressure, and also to prove the advantages to be gained by the use of traction in tuberculous disease of the hip.

CONGENITAL LUXATION OF THE HEAD OF THE RADIUS. Report of Two Cases; Analysis of Fifty-One Cases.—Blodgett (*Amer. Jour. of Orth. Surg.*, January, 1906.)—The author first reports two cases, one in a girl of 15 years, the chief complaint being a partial disability of either arm, illustrated by inability to grasp a plate or a spoon with the thumb on the upper surface; also there is unusual liability to fatigue in the arms. Radiographs showed on both sides an anterior position of the radial head, excessive length of the upper end of the radius, absence of the normal slight anterior concavity of the lower end of the humerus, and cancellated bone fusion of the upper part of radius and ulna. Case 2, a boy of 6 years. Since birth, fore-arms were fixed in extension and pronation. Radiographs taken show bilateral anterior position of radial heads, elongation of upper end of radius, no bone fusion. Owing to the permanent extension, the disability was great. At the age of four years, the upper end of the radius on each side had been excised. The boy can now feed himself, but he still grasps objects with thumb underneath.

Considering the cases reported in the literature, the author concludes that nearly two-thirds of the cases of congenital luxation of the head of the radius are in males; that it is equally common on the right and left sides; the commonest direction of the luxation is backward; forward luxations are nearly as common, and outward luxations only one in eight. In nearly all the double cases, mobility is more or less restricted. Supination is the motion most often lost. Elongation of the proximal end of

the radius seen in three-quarters of the cases; bone fusion of the upper part of the radius and ulna is present in one-third of the cases; in nearly half of the cases, there is some other deformity, oftenest partial deficiency of ulna or radius.

The congenital character of some of the fifty-one cases reported is open to doubt.

The factors to be considered in etiology are the special embryology of the elbow; congenital syphilis; heredity, and the conditions leading to congenital luxations in general. Excision of the head of the radius is indicated by considerable restriction of flexion or extension in uncomplicated cases. It is probably contra indicated in cases with practically free flexion and extension, or permanent pronation and bone fusion.

OUTDOOR LIFE VERSUS CONFINEMENT, IN THE TREATMENT OF BONE TUBERCULOSIS.—Wilson (*Penna. Med. Jour.*, January, 1906).—The object of this paper is to attract attention to the benefits to be derived from the open-air treatment of bone and joint tuberculosis and resulting conditions; to contrast such treatment with the results of confinement, and to earnestly urge the more general adoption of measures too seldom employed, and the value of which are too late recognized. The life-work of many orthopedic surgeons has been devoted to perfecting various methods of arresting the process of tuberculous bone and joint disease. It has been definitely established that tuberculosis of the bone need not run its course of extensive destruction, deformity, emaciation and death; that the three stages of hip disease are unscientific, unreal and to be discounted. It has been observed that osseous tuberculosis does not demand the varied atmospheric conditions that are necessary in the treatment of phthisis. Sleeping in tents or shacks, with the temperature almost at zero has not been injurious. Environment, mechanical fixation, appropriate clothing, feeding, occupation, exercise, massage, Bier's congestive method, various operative and corrective measures, require consideration in connection with the out-door life; but it has been noted that patients gain increased circulatory activity, which permits absorption and repair; have increased appetite, and possess a markedly improved mental attitude, when subjected to the open-air treatment. Surgical procedures should be ultra-conservative and offer the least possible interference with the outdoor life.

A NEW SCOLIOSIS APPARATUS.—Heusner (*Zeit. fur Orth. Chir.*, Band xiv, Heft 3-4).—This apparatus consists of fixing the child upon a board by the use of half-ringed pressure pads, which over-correct the side division of the spine, and produce fixation. The apparatus is designed to be used at night, in conjunction with exercises and massage employed in the day-time.

FRACTURES OF THE METACARPAL BONES.—Russ (*Annals of Surg.*, February, 1906).—Since the X-Ray has come into use in diagnosing fractures, it is safe to assume that many cases which had previously been diagnosed as contusions and dislocations are now definitely seen to be fractures of the metacarpal bones. There is scant literature on this subject, this fact leading the author to collect a series of twenty-seven cases.

These fractures present few difficulties. The fractured bone is well splinted by its fellows. Deformity is often slight, and reduction fairly easy. Of the twenty-seven cases reported, one case occurred between the ages of 10 and 20 years; eight cases between 20 and 30 years; ten cases between 30 and 40 years; five between 40 and 50 years; two between 50 and 60 years, and one over 60 years. In but one case of the series was more than one metacarpal bone fractured. These cases were practically free from complications. The first metacarpal was fractured in 29 per cent; the second in 15 per cent; the third in 11 per cent; the fourth in 15 per cent; the fifth in 26 per cent; and the fourth and fifth together in 4 per cent. A fracture usually results from indirect violence,—a blow delivered with a clenched fist, the force being received on the distal end of the bone, and operating in the direction of its long axis. The diagnosis presents few difficulties. All the bones are easily palpable, and in fresh cases crepitus can generally be obtained.

Scudder recommends the following method, both for purposes of diagnosis and to accomplish reduction: "Grasp the finger corresponding to the fractured metacarpal in the whole right hand, steadying the uninjured metacarpal with the left hand, and make steady and continuous traction." In one of the author's cases, where there was considerable displacement, reduction was accomplished by means of forcible traction, and the following dressing was then applied: Two slate-pencils were placed as coaptation splints, on each side of the broken metacarpal, two in the palm of the hand and two on the back of the hand. This extended from the metacarpal base to the middle of the shaft of the first phalanx. The slate-pencils were firmly secured in position by means of two narrow strips of adhesive plaster passed about the hand.

GENITO-URINARY SURGERY.

IN CHARGE OF

H. McC. JOHNSON, M. D.

THE DIAGNOSIS OF LARGE NEOPLASMS IN THE LEFT HYPOCHONDRUM.
—Giauffer (*Am. Jl. of Urol.*, February, 1906).—In reporting cases in which a neoplasm of the left kidney was diagnosed as splenomegalia, and a hydatid cyst of the spleen and omentum mistaken for a tumor of the left kidney, draws the following conclusions: In diagnosis of tumors of the left hypochondrium, it is sometimes very difficult to differentiate a renal growth from a splenomegalia. Under these circumstances the information obtained from the situation and shape of the tumor cannot be of any great value, and the same may be said of the results obtained by percussion. Ballottement is distinctly in favor of renal neoplasm but does not constitute a pathognomonic sign. A recently appearing varicocele is a most important symptom in favor of a renal localization of the growth. Examination of the blood should always be done and may occasionally solve the problem. On the other hand, examination of the urine is often insufficient, but intra-vesical separation should be undertaken in doubtful

cases and may give rise to very important results. Insufflation of the colon may always be undertaken on account of its inoffensiveness and easy execution and will perhaps, give some interesting information.

EXTROVERSION OF THE BLADDER; RELIEF BY TRANSPLANTATION INTO THE RECTUM.—Moynihan (*Annals of Surg.*, February, 1906).—This case is exceedingly interesting from the success obtained and from the fact that the nutrition of the large area of the bladder transplanted depended solely upon the vessels in the small amount of tissue left surrounding the ureters. A plastic operation had been performed fifteen years before with only partial success, the lower portion of the bladder which contained the ureters remaining exposed.

Operation: The catheters having been placed in the ureters, a median incision was made toward the umbilicus, through the flaps which had turned over the upper portion of the bladder at the previous operation. An incision was now made all around the mucous membrane of the bladder, between the mucosa and the skin, and the incision deepened by degrees until a good thickness of the bladder could be raised. Dissection was carefully carried toward the ureters until the whole bladder was isolated, leaving only as its pedicle the ureters with as much surrounding tissue as possible. The serous covering of the rectum was stripped up until four or five inches of the bowel were exposed, an incision three and one-half inches long was made in the rectum, into which the bladder, turned upside down, was placed and the catheters, previously inserted into the ureters, brought out of the anus. The edges of the bladder and rectum were stitched together with continuous Lembert sutures and the skin edges along the original median incision approximated except one inch at the bottom where apposition was impossible. The case made a satisfactory recovery. The catheters were left in position for four days; after their removal urine passed into the rectum and dribbled out at the anus which, owing to previous stretching, had not regained control. On the seventh day a little urine began to leak from the abdominal wound. This was stopped by suture on the fifteenth day and no further leakage occurred. All urine escaped by the rectum and at the end of a month control was perfect. Several months after operation the interval between the acts of emptying the rectum was three to five hours. The urine was normal on examination and no line of junction could be felt between the mucous membrane of what had been the bladder and the mucous membrane of the rectum. There was a fairly capacious cloaca.

SURGICAL INTERFERENCE IN MEDICAL NEPHRITIS.—Harrison (*Am. Jl. of Urol.*, February, 1906).—Considering the damage inflicted upon the kidney structure by increased tension within the capsule, and by continued contraction of a thickened capsule, the writer believes that surgical interference for the purpose of relieving tension is indicated in some forms of nephritis and gives the following indications for such procedure: (1) Progressive signs of kidney deterioration as shown by the persistence or increase of albumen when it should be disappearing from the urine, as in the natural course of inflammatory disorders ending in resolution. (2) Suppression of urine or the approach of this state. (3) Where a marked

disturbance of the heart and circulatory system occurs in the course of inflammatory renal disorders.

He does not believe it absolutely material to the issue which organ is selected for operation, unless there is something to indicate it, as both kidneys are usually involved and relief of one aids the other, and thus the normal amount and constitution of the urine may be re-established.

A NON-OPERATIVE METHOD OF TREATING PROSTATITIS.—SNOW (*Med. Record*, January 13, 1906).—The author describes the method of treating prostatitis by application of electrical currents which, by stimulating contractions of the structures of the gland, relieves it of the products of inflammation and restores tonic circulation, by this means overcoming the chronic process as far as possible, depending upon the amount of organic change which has already taken place. He reports several cases to show the results obtained and draws the following conclusions: (1) Where simple congestion is present in the early stages of the affection the relief is prompt. (2) When the gland has been enlarged for a number of years with resulting infiltration and the development of vesical irritation and obstruction of the urethral passages, the lesion is capable of being abated and the congestion relieved with the absorption of infiltrated exudates, the hyperplastic tissue only remaining. (3) In the aged, in whom the gland has become greatly enlarged, and is dense and hard from growth of hyperplastic fibroid tissue, the inflammatory process will be abated, affording a degree of relief to the obstruction commensurate with the site and extent of the inflammatory process. The dilatation of the bladder which has intervened may be greatly relieved, and cured in most instances, by the persistent application of the electrical current over the pubis and by an electrode carried high into the rectum and pressed forward against the bladder, together with judicious washing of the bladder and the use of strychnine. The current applied in this manner induces temporarily contraction of the muscular coats, and finally restores sufficient tone to enable the organ to empty itself completely.

GYNECOLOGY AND OBSTETRICS.

IN CHARGE OF

HUGO EHRENFEST, M. D.

HAS EXPERIENCE SUSTAINED THE MORE RADICAL OPERATION FOR CANCER OF THE UTERUS?—John G. Clark (*Surg. Gynec. and Obstetr.* Feb. 1906).—This paper contains a very complete history of the lymph-gland problem in the question of the radical operation for uterine cancer. Clark, once one of the strongest advocates, in fact one of the originators of the routine extirpation of the pelvic lymphglands, writes today: "My own conclusion, although very reluctantly reached—for I had hoped for decided improvements in permanent results—is, that we lose more than we gain in the radical operation when the glands are painstakingly

extirpated, and to remove here and there a palpably enlarged gland will certainly not promote the patient's interests, so far as a radical cure is concerned. My own rule, therefore, is to remove one or more glands for microscopic examination, provided they are palpably enlarged and easily accessible. If metastasis is found, the prognosis is inevitably bad."

His present operation consists of the extirpation of the uterus and the upper portion of the vagina together with the surrounding connective tissue by means of the cautery.

ON THE TREATMENT OF PUERPERAL ECLAMPSIA.—Roger de la Harpe. (*Jour. of Ob. and Gyn. of Brit. Emp.*, Febr., 1906.)—The treatment advocated in this article is that, without any exceptions, applied in the famous Rotunda Hospital of Dublin. It differs essentially from the mode of treatment generally advised by American authorities. "Induction of labor is never performed, nor is labor counted on in this treatment. The only intervention permissible locally (and this only in very exceptional cases) is the application of forceps, the head being on the vulva."

The chief feature of the Rotunda treatment is the administration of morphia in heroic doses. Half a grain is given hypodermically, and repeated, if necessary, in a dose of a quarter or a grain every two hours, up to a maximum total of two grains in 24 hours. The elimination of toxic material is propagated by washing of the stomach, and introduction of fluid through the stomach tube and into the rectum. [No mention is made of hypodermoclysis!] The writer lays special stress upon the necessity of keeping the patient continuously on her side in order to prevent foreign bodies from entering the trachea and so causing pulmonary edema and its sequences.

The fact that in the Rotunda Hospital the mortality of eclampsia is 16.9 per cent proves to the author conclusively that this is the best mode of treatment of puerperal eclampsia.

In the discussion following the reading of this paper before the Royal Academy of Ireland, Sir Arthur Macan pointed out the fact that the profession almost universally recognized that the termination of labor was a very important point in the treatment; the use of dilators, of Cesarian section, etc., all pointing to a belief in the efficacy of delivering the woman, and to a non-belief in the efficacy of the morphia treatment. Horne objected to the essayist's comparison of statistics of twenty-five years ago with those of the last ten years, because the introduction of antiseptics certainly had reduced the mortality. Every case had to be treated on its merits. There is no routine treatment of eclampsia, and we must be prepared to use morphia, and in other cases, vaginal section, or the Bossi dilator or Cesarian section. Of special interest were the remarks of Jellett, who has been represented by that most ardent defender of extreme conservatism, Herman, as a defender of the radical treatment when in fact at that time he was distinctly opposed to it. Since that time, in view of more modern statistics, his views have changed and he was looking with favor on the radical treatment in severe cases. The radical treatment of emptying the uterus from the start should be adopted in certain instances. As far as the proceedings of this meeting are recorded in the *Jour. of Ob. and Gyn. of the Brit. Emp.*, (vol. ix., p. 70) only

the chairman, R. D. Purefoy, supported the essayist's conservative views by stating that no method of rapidly emptying the uterus had ever commended itself to him.

BLOOD EXAMINATIONS IN PUERPERAL FEVER.—Kownatzki (*Hegar's Beitr. sur. Geb. und Gyn.*, vol. x., h. 2, 1906).—Even the bacteriologic examination of the lochial secretions proves unreliable in the prognosis of puerperal infection. More satisfactory in this respect, in the author's opinion, is the examination of the blood. From observations made in twenty-eight cases the following conclusions are drawn: 1. *Prognostically favorable*: Little or no change in the proportion of mono and polynuclear neutrophiles. The presence of eosinophiles. 2. *Prognostically unfavorable*: A leucocytosis of about 50,000, an increase in the proportion of the mononuclear neutrophiles, an absence of eosinophiles, a reduction in the number of erythrocytes. 3. *Improvement to be expected*: Reduction in mononuclear neutrophiles, appearance of eosinophiles. 4. *Turn to the worse probable*: Reduction of number of both mononuclear neutrophiles and eosinophiles. 5. *Prognostically absolutely bad*: Appearance of poikilocytosis with polychromasy and appearance of nucleated erythrocytes.

The writer employed the May-Gruenwald eosin-methylen blue stain which does not require a fixation of the specimens.

PEDIATRICS.

IN CHARGE OF

ALFRED FRIEDLANDER, M. D.

RHEUMATISM IN CHILDHOOD.—In a symposium on this subject at the New York Academy of Medicine (*Arch. of Pediatrics*, January, 1906). Bovaird discussed the pathology and etiology. He believes that there is some ground for the theory of a hereditary predisposition, though it would seem to be less important than is generally supposed. He accepts the diplococcus rheumaticus as the specific etiological factor of the disease because of its discovery by many independent investigators in the blood tissues, secretions and excretions of rheumatic patients, because of its isolation in pure culture, and because its inoculation in susceptible animals regularly produces arthritis, pericarditis, endocarditis, myocarditis, pleurisy, iritis and chorea. While the chain of evidence is not quite complete, it seems fair to conclude that rheumatism is an infectious disease even though the specific cause is not yet definitely demonstrated.

McConnell has analyzed five hundred cases from the Vanderbilt Clinic, with reference to the first rheumatic manifestations. In 35 per cent of these cases, tonsillitis was the first sign of the rheumatism. Endocarditis occurred as the primary manifestation in 23.5 per cent of the cases, and about the same proportion showed articular signs first. In 14.5 per cent of the cases, chorea was the first manifestation. Growing pains occurred

first in 2 per cent, but it is noteworthy that of these cases, 60 per cent were complicated by some cardiac lesion. Torticollis occurred in 1 per cent, purpura in 0.5 per cent.

Kerley discussed the differential diagnosis. He says that under fifteen months the disease is very rare. The majority of his cases have occurred in children between five and ten years of age. The history of previous attacks of angina, chorea, asthmatic bronchitis, and evidence of former cardiac involvement are important factors in diagnosis. Scurvy is frequently confused with rheumatism but the age incidence of the two diseases is different, for scurvy is essentially a disease of infancy. Attention is called to the fact that the referred pain of Pott's disease, and of tubercular lesion of the hip are not infrequently confused with rheumatism. Syphilitic periostitis of the long bones is at times considered as rheumatism. In general, it may be said that the older the child, the more closely does rheumatism correspond to the clinical signs as seen in the adult. Endocarditis occurs in the majority of cases of acute articular rheumatism, and should be considered as a manifestation of the disease and not as a complication. In obscure cases, this may be a valuable diagnostic point, for the endocarditis may be the only rheumatic manifestation present at the time in a given patient.

Discussing the prophylaxis of rheumatism, Crandall spoke of the value of proper clothing for rheumatic children (flannel should be worn next to the skin all the year round). (2) Exercise and out of door life. Damp weather is apt to be much more dangerous than cold weather, and avoidance of exposure in damp weather is therefore essential. Exercise in moderation can only do good. Cool bathing and vigorous skin friction are often of value. (3) The prophylactic care of the throat, removal of adenoids and enlarged tonsils are to be strongly commended. The careful attention to even slight illnesses in rheumatic children, may at times ward off attacks. (4) Regarding prophylactic medication, the author insists upon the value of the salicylates, in small doses, given between the attacks. Such doses in some cases may be given with benefit for months at a time, even in the absence of any distinct rheumatic manifestation.

Concerning the dietetic treatment, Thompson says that rheumatism cannot be influenced specifically by any system of preventive diet. The dietetic treatment of this disease is covered completely by the fundamental principles for feeding any child, namely, to select foods for their digestibility, and to meet the demands of growth and development.

Concerning the medicinal treatment, Shannon finds that the salicylates act better when given in combination with soda and rhubarb. The treatment for the various symptoms and for the most important complications is detailed. The methods advocated are those in general use.

GLANDULAR FEVER.—Vipond (*Arch. of Ped.*, January, 1906), reports twelve cases, and insists that glandular fever is to be considered as a clinical entity. While he does not believe that the disease can be classed among the common infections of childhood, he holds that it cannot be considered rare, believing that it is frequently overlooked, that many cases of glandular fever are considered as cold, influenza, etc. The disease sets

in with the usual symptoms of infection in childhood, fever, malaise, pains in limbs, etc. In 24-48 hours, there is usually pain and stiffness in the neck, with the enlargement of the lymph nodes. It is to be noted that there is very rarely any associated pharyngitis. The nodes at the angle of the jaw, and those at the anterior border of the sterno-mastoid, later those at the posterior border of the muscle, become involved. The patient is fairly comfortable while at rest, but the slightest movement of the head causes severe pain. The axillary and inguinal nodes are involved in most cases. It is probable that the mesenteric nodes are involved in many cases, inasmuch as abdominal pain and tenderness are usually marked. The evening temperature remains high for from three to seven days, often ending by crisis. Swelling of the glands usually persists for at least three weeks. In some cases suppuration occurs, though the author is inclined to the belief that in these cases we are not dealing with a true glandular fever, but with a local source of infection somewhere.

The prognosis is usually good. Hematuria and nephritis have been noted as occasional complications. The treatment advocated is largely symptomatic. Locally, iced bichloride compresses have given the author good results.

ACUTE FATAL CHOREA.—Leante (*Thèse de Paris*, 1905, *Rev. Mens. Janvier*, 1906), says it is universally recognized that death does occur in chorea. In certain cases death comes on rapidly, preceded by well marked acute phenomena. These acute, fatal cases of chorea are caused by diverse infections, in a third of the cases, by rheumatism.

This fatal form is characterized by its infectious causative factors, and by the existence of definitely infectious phenomena, among which are: hyperpyrexia, rapidity of the pulse, and the occurrence, in some cases, of ante mortem erythemata of various kinds. The course of this form is marked by its rapidity and in the course there occur various lesions of the body tissues, more particularly cardiac degenerations.

NEUROLOGY.

IN CHARGE OF

SIDNEY I. SCHWAB, M. D.

THE HISTOLOGICAL APPEARANCES OF THE CORD AND MEDULLA IN A CASE OF ACUTE ASCENDING PARALYSIS.—Workman Hunter. (*Rev. Neurology and Psychiatry*, February, 1906).—The symptoms of this case were apparently those of an acute ascending paralysis and from the clinical point of view might be regarded as belonging to the group to which Landry's paralysis has been given. The lesion found on microscopic examination was that of an acute myelitis. There was a marked infiltration of round cells throughout the whole length of the cord. This was most abundant in the lumbo-sacral and dorsal regions, rather less in the cervical. The white matter of the cord was unaffected except that the peri-

pheral arteries running through it showed infiltration in the perivascular spaces but not in the tissue beyond that. The vessels in the cord were greatly dilated and there was some slight capillary hemorrhage into the grey matter. The appearance therefore was that of an acute diffuse interstitial myelitis limited to the grey matter of the cord in which the nerve cells showed definite pathological changes, with the inflammatory process passing upward into the grey matter of the medulla and pons. The case is regarded as a form of intoxication in which a toxin of some sort gained entrance into the circulation and that it acted on tissues unusually sensitive to such toxin, producing a degeneration in ganglion cells and at the same time determining the infiltration of round cells which are such a marked feature of the case.

AN UNDESCRIBED SYMPTOM OF PARALYSIS OF THE SOFT PALATE (CHANGE IN THE CHARACTER OF THE SPEECH DISTURBANCE IN LYING DOWN AND IN SITTING UP.)—Schlesinger (*Neurol. Cent.* No. 2, 1906).—Three cases are here described in which a peculiar phenomenon was observed consisting of the alteration in speech in different positions of the patient. When the patient was lying down the speech was a great deal clearer than when sitting up. One case was multiple sclerosis and the other two cerebro-spinal syphilis. The explanation of the symptom is based upon the mechanical factors involved in the position of the flaccid palate.

DEMENTIA PRAECOX IN FRANCE WITH SOME REFERENCES TO THE FREQUENCY OF THIS DIAGNOSIS IN AMERICA.—Farrar (*American Journal Insanity*, No. 2, 1905).—This is a most readable and suggestive article and throws light on a question which is a disturbing factor in most meetings of societies devoted to the discussion of this question. Krapelin's description of this type and its growing importance is measured by the headway it has made among the French alienists who, in the beginning, were opposed to its acceptance in the classification. Farrar describes the evolution of this idea in France, dealing especially with the meeting of the French alienists at Pan, 1904, where the issue was squarely met and where the opposing forces had a chance to state their views clearly. As a result it was clearly seen that their idea of dementia praecox had made great progress in France and that, on the other hand, there was as yet, no unanimity of opinion in regard the exact meaning that was to be attached to the term. An examination of the records of some prominent American asylums showed that dementia praecox was gradually growing in popularity and at the expense of the time honored and all-embracing receptacles, mania and melancholia.

PROGRESSIVE MUSCULAR ATROPHIES; A STUDY OF THE CASES AND CLASSIFICATION WITH THE REPORT OF AN AUTOPSY.—Dana (*Journal Nerv. and Ment. Dis.*, February, 1906).—This paper is a study of the records of seventy-two cases of progressive muscular atrophy of bulbar or spinal origin. The three points which the author has especially studied in connection with these histories are the clinical classification, the ætiology and especially the etiological relation of syphilis to this disease and the

question of the proper status of the so-called chronic anterior poliomyelitis and its relations to the atrophies. The general conclusions of this study are that all groups of central progressive atrophy not due to a tumor, are essentially the same disease in genesis, course and underlying pathological condition, except that we may separate the progressive occupation atrophies and certain acute atrophies. Amyotrophic lateral sclerosis, though pathologically and essentially of the character of the other atrophies, may receive a separate name on account of its clinical and anatomical peculiarities. The grouping would then be progressive muscular atrophy; amyotrophic lateral sclerosis; progressive occupation atrophy (not the ordinary limited and arrested type), subacute progressive atrophy, often recurrent and usually syphilitic. Progressive muscular atrophy is most often excited by prolonged muscular overexertion. It is in one-quarter at least of the cases, parasyphilitic and in the other parainfectious.

OPHTHALMOLOGY.

IN CHARGE OF

JOHN GREEN, JR., M. D.

THE BACK OF AN EYE FROM A CASE OF AMAUROTIC FAMILY IDIÖCY:—F. J. Poynton and J. H. Parsons (*Ophthalm. Soc. of the United Kingdom*, Meeting of Nov, 9th, 1905).—The specimen was taken from a child the youngest of a Jewish family in which this disease had manifested itself; this child during life had presented the usual symptoms and retinal changes of the disease. On removal of the posterior half of the globe and on floating it in water it was found that there was a minute hole in the retina at the macula, and at the macula itself—if there was any retina at all—it was so thinned and atrophied that its presence could not be detected, but just round this hole the retina appeared considerably thickened. The choroid was cherry red in colour and the explanation of the cherry red spot could be strikingly demonstrated by floating a strip of white paper between the choroid and the retina when the spot vanished, to reappear when the paper was removed. The red spot was produced by the choroidal pigment seen through the minute aperture, its vivid colour being made more apparent by the zone of pallor—the result of thickening of the retina—round it.

OCULAR SYMPTOMS OF AFFECTIONS OF THE ACCESSORY SINUSES OF THE NOSE.—W. C. Posey (*Jour. A. M. A.*, September 9, 1905).—This paper is a very complete synopsis of ocular symptomatology in accessory sinus disease and will well repay reading. Posey calls attention to the increasing number of practitioners who limit themselves to either ophthalmology or rhinology as contrasted with conditions a few years back when these specialties were almost always associated. He finds this divorce not altogether a fortunate one, especially in the light of recent knowledge of the important role played by the accessory sinuses of the nose in the etiology of many ocular troubles.

Disturbances in vision and the visual fields. In many inflammatory conditions of the sphenoidal and posterior ethmoidal cells the optic nerve is involved to a greater or less degree. Edematous infiltration of the nerve occurs, characterized ophthalmoscopically by slight veiling of the edges of the disk and dilation of the retinal veins. If the sinusitis be unchecked a true retrobulbar inflammation may develop. Vision is apt to be found somewhat impaired, especially under diminished illumination. At times central and paracentral scotoma with concentric contraction of the field, can be made out.

Changes in the orbit. Most inflammations of the orbit are occasioned by accessory sinus inflammation. An early sign of involvement of the orbit is a change in the contour of the orbital ring. The character of the displacement of the globe may be of value in determining the particular sinus involved. The location of a pointing abscess may also indicate the sinus affected. The special ocular symptomatology of involvement of the different sinuses is carefully considered. It is not necessary that there should be an actual destruction of bone to give rise to suppuration in the orbit, as infection may be carried by fine vascular or lymphatic emissaries.

Affections of the lachrymal apparatus. Prelachrymal abscess, originating in the frontal sinus or deeper parts of the orbit, may very closely simulate abscess of the lachrymal sac. On passing a probe into the sac no pus is released and it is not reached until the probe is passed horizontally into the inner orbital wall.

Affections of the lid. A persistent edema is the most marked lid symptom of sinus disease. It is most marked in the mornings and may be brought on by bending the head forward.

Affections of the extraocular muscles. Complete paralysis may ensue from acute inflammation of the apex of the orbit secondary to acute ethmoiditis and sphenoiditis. Paresis may be occasioned by direct inflammatory infiltration of the belly of the muscle itself, or by an involvement of the nerves as they enter the orbit. Diplopia is not, as a rule, complained of, but can often be elicited in the periphery of the field. Often the imbalance created is sufficient to confuse vision, cause vertigo and render near use of the eyes difficult. The palsies may be transient and may disappear, only to reappear. On this account and because of the pain, such a condition due to sinusitis may be mistaken for recurrent oculo-motor palsy.

Affections of the conjunctiva. Conjunctivitis, often follicular in type, is frequently associated with sinus disease.

Affections of the cornea. Occasionally herpetic-like blisters may form on the cornea as a consequence of implication of the fifth nerve as it passes along the outer wall of the sphenoidal sinus.

Affections of the uveal tract. The author is not inclined to accept the theory of a sinus origin for certain cases of uveitis despite the recent positive assertions of Fish, Fromaget, Zeim and others.

Asthenopia. Asthenopia may be traced to an interference with the ciliary muscle, and actual testing will show a diminution in the range of accommodation.

Headache and neuralgia. The headaches of sinusitis usually occur in the morning and are characterized by continuous pain with exacerbations which radiate around the orbit and within the zone of distribution

of the fifth nerve. Injection of the conjunctiva is often present. The location of the pain is generally characteristic and will enable a shrewd guess to be made as to the sinus involved. In frontal sinusitis pain is evoked by palpating the forehead and the roof of the orbit at its upper inner angle.

INFLUENCE OF FRYNIN ON THE EYE.—V. Popow. (*Ophthalm. Review*, January, 1906).—Frynin, the alcoholic extract from the cutaneous and so-called parotid glands of toads, has been prepared by Popow according to Kravkow's method. For instillation into the conjunctival sac, he uses a one per cent. aqueous solution, boiled before use. Blepharospasm, free lachrymation and photophobia are evoked immediately upon dropping the solution into the conjunctival sac; later, edema and slow loss of sensibility of the cornea. The epithelium of the cornea is affected much as cocaine affects it. The pupil is narrowed slightly, but refraction, accommodation, vision and the field of vision remain unchanged. No augmentation of intraocular tension.

Popow has performed under the influence of frynin iridectomies, discissions and some openings of the puncta.

LARYNGOLOGY AND OTOTOLOGY.

IN CHARGE OF

WILLIAM E. SAUER, M. D.

ANTROTOMIES AND RADICAL OPERATIONS UNDER LOCAL ANESTHESIA.—Neuman. (*Zeitschrift fuer Ohrenheilkunde*, January, 1906.)—The author reports in detail ten cases in which the antrum was opened in acute mastoiditis and ten cases in which radical mastoid operations were done under local anesthesia. His method of procedure is as follows: The patient is given a full meal, as it has been found that the danger of a cocaine intoxication is greatly lessened after a full meal. The field of operation is prepared in the usual way and a solution, consisting of 5 cm. of a 1 per cent sol. cocaine, 12 drops of adrenalin and 3 cm. of normal salt solution is injected under the periosteum at several points over the mastoid. The author has devised a special syringe with a strong needle. These injections are easily made over all portions of the mastoid, excepting the tip where the periosteum is very adherent, but even there portions can be made anesthetic. Another important point is to anesthetize the anterior surface of the mastoid; this is done by inserting the needle just at the anterior insertion of the auricle parallel to posterior wall of the auditory canal. At the end of ten minutes the operation can be begun. For the radical operation from 7 to 8 c.m. of a 1 per cent sol. of cocaine, 15 drops of adrenalin and 5 to 6 c.m. of normal salt solution are used. The injections are made at the same points with additional injections in the superior, inferior, anterior and posterior walls of the external auditory canal, just at the junction of the cartilaginous and membranous canal. In all the cases reported the time required for the operation was

from one hour to an hour and a quarter. The operation was all completed with practically no pain, only in the radical operations. The curetting of the Eustachian tube was always painful, even when a pledget of cotton soaked in a 20 per cent solution of cocaine had been applied, but as this required only a moment, this is not looked upon as a serious objection.

The contraindications for the use of local anesthesia in these operations are (1) a subperiosteal abscess. In these cases there is an interference with the absorption of the cocaine solution. (2) In very nervous individuals local anesthesia is not advisable. (3) It is contraindicated in all cases where a general anesthetic is contraindicated. In cases where the posterior or upper canal wall has become loosed from the bony wall.

THE INDICATIONS FOR OPERATION IN CHRONIC SUPPURATION OF THE MIDDLE EAR.—Smye. (*British Medical Journal*, Feb. 3, 1906.)—The objective signs indicating operations in cases of chronic suppuration of the middle ear are, according to Smye, as follows: 1. Pain on pressure over the mastoid, or more particularly over the antrum, that is, immediately behind the petro-superior angle of the meatus. This may be accompanied or not by post auricular swelling, and points to the supervention of an acute mastoiditis, or more often to caries affecting the external wall of the mastoid process or of the antrum. There is a possibility of error with reference to this sign, which to recognize will be to avoid. Furunculosis may occur with acute as well as with chronic otorrhœa. It is frequently attended by a temporary swelling behind the auricle. The absence of sagging of the postero-superior wall of the meatus, which is commonly got in mastoid empyema as a result of acute middle ear suppuration, will point rather to caries of the external antral or mastoid wall. 2. A sinus behind the ear leading to an erosion into the bone. This is self-evident. 3. Caries of the petrous bone as disclosed by examination with the speculum and probe. The examination should be conducted methodically, the different parts of the ear being sounded with the probe to discover early carious foci. The caries may be isolated and accessible to treatment through the meatus. 4. An extensive or recurring growth of granulation tissue, pointing to invasion of the bone, is looked upon by Smye as a decided indication for operation. 5. Facial paralysis. 6. The presence of thick, cheesy masses in the tympanic cavity, the inference being that the same condition exists in the antrum. 7. Very foul smelling discharge. This is often the result of extensive involvement of the bone and the discharge may not be of large amount. 8. Stenosis of the meatus, either membranous or bony, both of which may be due to irritation caused by the purulent discharge. 9. Bacteriological examination of the discharge has hardly yet reached the stage of clinical importance. At present it would appear that a pure streptococcus infection is more destructive than the usual mixture of streptococci and staphylococci. The colon bacillus and the pneumococcus seem to exert a special baneful influence. 10. Persistent discharge in spite of regular and thorough antiseptic treatment.

SOME UNUSUAL MANIFESTATIONS OF SYPHILIS IN THE UPPER AIR PASSAGES.—Simon (*British Medical Journal*, Jan. 13, 1906) reports the following four unusual manifestations of syphilis of the upper air passages: 1. Precocious tertiary syphilis of the throat and tongue of malignant type. 2. Tertiary syphilis of larynx and trachea followed by isolated tertiary syphilis of the naso-pharyngeal cavity. 3. Early fibroid infiltration of pharynx and larynx in a case of obstinate recurring secondary syphilis. 4. Tertiary syphilis of the larynx manifested particularly by periodical inflammation of ephemeral papillomatous excrescences. These cases are striking illustrations of the many varied forms in which the disease may manifest itself. They also showed that, while ordinarily it is easy enough to follow the routine methods with regard to diagnosis and treatment, yet cases occur where no set rule can be followed. The inunction treatment is most successful in syphilis of the upper respiratory passages, yet in two of these cases it failed. In the first case, neither the mercury or potassium iodide could be employed, showing that in some cases anti-luetic treatment must not always be persisted in.

ALYPIN IN RHINO-LARYNGOLOGICAL PRACTICE.—Finder (*Berliner Klinische Wochenschrift*, Jan., 1906).—The author has been experimenting with alypin, a glycerine product, as a substitute for cocaine. Alypin is placed on the market by Friedr. Bayer and Co. of Elberfeld, Germany, as a white, crystalline powder, which is readily soluble in water and is of neutral reaction. It is claimed that it is 2 to 3 times less toxic than cocaine. In contradistinction to cocaine it is a vaso-dilator, which makes it a very valuable anesthetic in certain operations in the nose. The author states that alypin in 20 per cent solution has been employed extensively for several months in the University of Berlin clinic for diseases of the nose and throat, and in no case have they had any disagreeable symptoms arising from its use. Finder believes it is of special value in endolaryngeal surgery. He has operated on a number of cases of tuberculosis of the larynx and found the anesthesia entirely satisfactory, the anesthesia lasting from 8 to 10 minutes. He concludes that this anesthetic is a satisfactory substitute for cocaine and especially valuable in laryngo-rhinological practice.

DERMATOLOGY AND SYPHILIS.

IN CHARGE OF

MARTIN F. ENGMAN, M. D.

MUCOUS MEMBRANE LESIONS IN LUPUS ERYTHEMATOSUS.—Thomas Smith (*Brit. Jl. of Derma.*, February, 1906).—Lupus erythematosus upon the mucous membranes is rather a rare condition and when it does occur can easily be confounded with syphilitic lesions of that tissue, especially when it occurs in the mouth. The writer of this article quotes sixteen cases and finds that the most common site of the lesion is on the mucous membrane of the cheeks opposite the upper and lower molars. Next in

frequency the hard palate is involved. He comes to the following conclusions: 1. Lesions of the mucous membrane in lupus erythematosus are more common than is generally supposed, the collection of cases referred to in his article giving a percentage of 28. 2. The lesions are proportionately more frequently met with in cases of the disseminated type. 3. The affection is most commonly seen on the mucous membrane of the inner surface of the cheeks. 4. The presence of the lesions is an important aid in diagnosis. 5. The lesions do not materially affect the course of the symptoms of the disease and do not appear to call for any special local treatment.

PITYRIASIS VERSICOLOR TERMED TUBERCULOSIS DERMATOMYCOSIS.—Piery and Renoux (*Lyon médicale*, January, 1906).—The writers conclude from the careful inoculation of scales of pityriasis versicolor into the guinea pig from the human that it is capable of causing tuberculosis in the animal. Control experiments from the scales did not cause tuberculosis in guinea pigs. The writers state that pityriasis versicolor occurs most often in cases of abortive tuberculosis and they think from the results of their work that pityriasis versicolor may be considered as a probable tuberculosis dermatomycosis.

TREATMENT OF PSORIASIS.—E. von Düring (*Deutsch. med. Wochen.*, December, 1905).—Von Düring thinks that more attention should be paid to baths in the treatment of psoriasis. Hot and cold douches should be used, the length of the douches depending on the sensitiveness of the skin of the individual. Sweat baths are also of importance. He prefers oil of cade to chrysarobin and interdicts the use of alcohol, coffee, and tobacco and a too nourishing diet. He does not place much stress upon the internal treatment of psoriasis, using internal treatment only symptomatically.

THE RELATION OF LESIONS OF THE GASSERIAN AND POSTERIOR ROOT GANGLIA TO HERPES OCCURRING IN PNEUMONIA AND CEREBRO-SPINAL MENINGITIS.—W. T. Howard, Jr. (*Am. Jl. of Med. Sc.*, December, 1905.)—The writer brings forth additional proof to show that herpes zoster as well as the herpes in pneumonia and cerebro-spinal meningitis is dependent upon lesions of the sensory ganglia, which may be caused by different agents. He found the changes identical with those described by Head and Campbell. He believes the changes in meningitis to be due to extension of the inflammatory processes along the nerve roots and in other conditions the toxic material is brought to the ganglia through the circulation.

SOCIETY PROCEEDINGS.

ST. LOUIS SURGICAL SOCIETY.

Meeting of January 17, 1906.

AXILLARY CARCINOMA WITH INVOLVEMENT OF NERVES.

Dr. Guthrie McConnell read a paper with this title for which see page 310.

DISCUSSION.

Dr. Glasgow asked if it was not generally the case that some effect of the cancerous growth was seen beyond the zone of the actual cancer. When there is a malignant growth on the outside it will generally be found that the growth extends internally.

Dr. McConnell said there are certain reactions seen, but usually they are more of an inflammatory character, that is, an increase of connective tissue cells, and as a rule the epithelium does not take on a malignant change. The change is more of a degenerative nature. In the specimen indicated a close examination would show that comparatively normal epithelium could not be found except at quite some distance from the ulcerative process. The criticism in regard to ascites not being marked in the early stage seemed to him not valid, because it is known that increased blood pressure does not cause transudation. There must be some molecular change in the walls of the vessels. In the liver there is a growth primarily occurring around the portal vein. At first there is merely pressure upon the vein, the blood pressure consequently being increased, but we do not then have degenerative changes taking place between the vessel walls, so that there would not be any transudation. Then, again, he believed the degeneration was due more to the toxemia than to the action of the surrounding connective tissue. This, he thought, would explain the later appearance of the ascites and would also support the toxic theory.

In regard to Dr. Glasgow's question concerning the enlargement of the abdominal vessels, he thought that could be explained on the theory of the blood seeking the direction of the least resistance.

BOOK REVIEWS.

HYGIENE AND PUBLIC HEALTH. By B. Arthur Whitelegge and George Newman. Chicago: W. T. Keener & Co., 1905.

The book represents a very complete and clear representation of the present status of the subjects named in the title, combined with a sane and restrictive tendency of views in the direction of perfectness and absoluteness. It is a very valuable work as a source in which reference to any problem of hygiene and public health may be easily and fully found. That the consideration of English modes of dealing with the problems discussed stands in the foreground is, to the American reader, a great and instructive advantage. It is to be hoped that a similar rendition of the views of German hygienic science may be made as easily accessible.

DIFFERENTIAL DIAGNOSIS AND TREATMENT OF DISEASE. By Augustus Caillé, M. D. D. Appleton & Co., 1906, New York and London.

The practitioner who desires the entire compass of internal and special diagnosis and treatment compressed into the compass of one not too bulky volume will find this a useful book. The descriptions are clear and concise and the illustrations numerous and generally excellent. The very nature of the task which the writer has set himself necessitates, however, much omission and frequent incompleteness in discussion.

PHARMACOLOGY AND THERAPEUTICS. By Reynold Webb Wilcox, A. M., M. D., LL. D. Sixth Edition. P. Blakiston's Son & Co., 1905, Philadelphia.

A revision of White and Wilcox's *Materia Medica and Therapeutics*, bringing it into harmony with the last edition of the *Pharmacopoeia*. It is a companion volume to *Materia Medica and Pharmacy* by the same author.

MATERIA MEDICA, PHARMACY AND THERAPEUTICS. By Sam'l O. L. Potter, A. M., M. D., M. R. C. P. Tenth Edition. P. Blakiston's Son & Co., 1906, Philadelphia.

The tenth edition of Dr. Potter's book continues the traditions of its predecessors. It is a mine of readily accessible information, especially in *materia medica* and *pharmacy*. The therapeutic portion is of less value, but may doubtless occasionally also be found useful.

CHIRURGIE OTO-RHINO-LARYNGOLOGIQUE. (Oreille, viz., Sinus de la Face Pharynx-Larynx Trachei.) Par Georges Laurens, Ancien Assistant d. Oto-Rhino-Laryngologie des Hospitaux de Paris. Avec 470 figures dans le text. Paris: G. Steinheil, Editeur, 2 Rue Casimir Delagvigne 2. 1906.

No better evidence has been offered of the wonderful strides that have been made in the surgery of the upper respiratory tract than are given in this publication. It has not been many years since the surgery of the ear was confined to a few operations on the drum membrane and the trephining of the mastoid. The removal of nasal polypi and adenoids was as far as the rhinologist dared to venture. The removal of a growth from the vocal cord was considered an extraordinary performance. Today the surgery of the ear has been extended to the brain and its meninges, while the rhinologist has invaded the accessory sinuses and the laryngologist does not hesitate to invade, not only the trachea, but the bronchi. The number of operative procedures have increased to such an extent that Laurens has devoted almost a thousand pages to a discussion of the classical ones alone. In this work the author has

very systematically taken up the minor and major operations on the ear, nose and throat. The different methods are briefly but clearly described in each instance. The technic with the indications and contraindications are carefully gone into. The results and accidents are also described at length. The chapter on the otitic brain complications is clear and profusely illustrated. The chapter on accessory sinus disease also merits special consideration. In addition, all the modern method of examination requiring special technic, such as tracheoscopy and bronchoscopy, are carefully considered, making this an up-to-date work on surgery of the ear, nose and throat.

PATHOGENIC MICRO-ORGANISMS INCLUDING BACTERIA AND PROTOZOA. A Practical Manual for Students, Physicians, and Health-Officers. By William Hallock Park, assisted by Anna W. Williams. 1905. Lea Bros. & Co., New York and Philadelphia.

The second edition of Park's Manual is, as it were, a new book. The enclosing in its scope of the protozoal infectious diseases was a very necessary factor, in view of the inaccessibility of literature on this branch of parasitology for ready information. It is unnecessary to go into details about the single items dealt with. From a man like the author, with his unlimited experience, it is *a priori* certain that only the best and most reliable information is given. While for physicians and health-officers the book will be an inexhaustible source of interest and advantage, it appears to the reviewer that its level is beyond that of the ordinary student. Abbott and McFarland will be better for him. To the initiated reader the manual is particularly interesting, as in it in many places the personality of the author stands in the foreground; not too much, though, to interfere with the uniformity of the manner of demonstration. Park's book, in its second edition, will be well received; it is a relief after the dozens of books before us, one the picture of the other. Park's book is original; his wide experience has written it.

TEXT-BOOK OF MATERIA MEDICA FOR NURSES. Compiled by Lavinia L. Dock. Fourth edition. G. P. Putnam's Sons, New York and London. 1905.

This little book is well suited to the needs of nurses. All the most important drugs, synthetic as well as natural, are briefly described and their actions indicated. The new edition has been thoroughly revised by Miss Bean, of the Johns Hopkins Training School for Nurses, to meet the changes in the new Pharmacopoeia, and includes most of the newer remedies.

GRAY'S ANATOMY: DESCRIPTIVE AND SURGICAL. A Text-book of Human Anatomy. By Henry Gray, F. R. S., Lecturer on Anatomy at St. George's Hospital, London. New American, from 15th English Edition; freely revised and largely rewritten by J. Chalmers Da Costa, M. D., professor of surgery in Jefferson Medical College, Philadelphia, with the collaboration of a corps of specially trained assistants; in one magnificent imperial octavo volume of 1600 pages, with 1122 illustrations, in black and colors. Price with illustrations in black and colors: cloth \$6.00 net; full leather \$7.00 net. Price with illustrations in black: cloth, \$5.50 net; full leather \$6.50 net. Lea Brothers & Co., Publishers, Philadelphia and New York.

Henry Gray, the author of this work in its beginning, died young, leaving, however, a great masterpiece on human structure, which has served as the nucleus around which has been gathered all the knowledge that progress in anatomical study has produced. That the book has passed through fifteen editions is a significant fact. The volume here under consideration is a revision of the 15th English edition. Dr. Da Costa who combines in rare degree the qualifications of anatomist, surgeon and teacher, has made this revision in a thorough, searching and critical manner. This will be especially noted in the sections on the brain, spinal-cord, nervous system, abdominal viscera and lym-

phatics. Also the new nomenclature is given in brackets, following the current nomenclature, which serves the needs of a far greater number of readers than if one system only were used. The illustrations are in the main the same as have been seen in the various editions of Gray's Anatomy. Particular attention should be called to the anatomy of the lymphatic system, as it is here given in a more instructive and complete manner than in any other text-book on anatomy.

AMERICAN EDITION OF NOTHNAGEL'S PRACTICE. Diseases of the Blood. By Prof. Dr. P. Ehrlich, Prof. K. von Noorden, Dr. A. Lazarus and Dr. F. Pinkus. Edited with additions by Alfred Stengel, M. D. W. B. Saunders & Co., Philadelphia and London. 1905.

The work of Ehrlich and von Noorden, as well as that of Lazarus and Pinkus, upon the blood is too well known to require commendation here. This volume, which they have fathered, includes the normal and pathologic histology of the blood, anemia, chlorosis, leukæmia, chloroma, pseudoleukæmia, etc. These conditions are treated so exhaustively, and the theories discussed so carefully, that the work will doubtless "remain the last word on the subject for many years."

Prof. Ehrlich contributes the chapter on "Histology of the Blood, Normal and Pathologic;" Dr. Lazarus on "Clinical Features of Anemia and Myeloid Leukæmia;" Prof. von Noorden on "Chlorosis," and Dr. Pinkus on "Leukæmia." Some idea of the completeness of the work may be conveyed by the statement that it includes some seven hundred pages concisely and succinctly written. The literature has been so carefully collected that no link in the chain of development of our knowledge of the blood and its diseases has been omitted.

A TEXT-BOOK OF PHYSIOLOGY FOR MEDICAL STUDENTS AND PHYSICIANS. By William H. Howell, Ph. D., M. D., LL. D. W. B. Saunders & Co., Philadelphia and London. 1905.

As the title indicates, the volume is primarily intended for the use of medical students. For this purpose it is excellently fitted and deserves high praise. Physiologic facts and theories are set forth with admirable simplicity and clearness, and in a lucid style that cannot but hold the attention of the learner. From the bewildering number of researches, the writer has selected those of prime importance, passing by others which, though interesting and significant, might confuse the student or divert his attention from the fundamental principles which he is endeavoring to grasp. This very quality, admirable in a medical school text-book, limits its usefulness in other directions. For the weighing of recent conflicting testimony on some mooted point, the physician with physiologic interests will still have to turn to the German text-books. In the English language, Prof. Howell's book is now the best physiology obtainable.

A TEXT-BOOK OF PHYSIOLOGICAL CHEMISTRY FOR STUDENTS OF MEDICINE AND PHYSICIANS. By Charles E. Simon, M. D. Second edition, revised and enlarged. Lea Brothers & Co., Philadelphia and New York.

The author has endeavored to adapt this work "as much as possible to the wants of the medical student and the physician who, in the past, has been unable to devote the attention to the subject which it merits."

The first section of the work is devoted to a consideration of the three classes of foodstuffs and the most important products of their decomposition; the second section deals with digestion, absorption and secretion; the third section is devoted to the chemical study of the elementary tissues and the various organs of the body, the products of their activity, and their relation to physiological function. In this edition the chapters on the albumins, the products of nitrogenous katabolism, and on gastric and tryptic digestion, have been almost entirely rewritten.

A MANUAL OF PERSONAL HYGIENE. By American Authors. Edited by Walter L. Pyle, A. M., M. D. Second edition. W. B. Saunders & Co., Philadelphia, New York, London. 1904.

The object of this Manual is to set forth plainly the best means of developing and maintaining physical and mental vigor. It appeals both to medical men and to the laity; among the latter, especially to parents who are eager to have their children grow up among the best hygienic surroundings. Each of the chapters has been written by a physician of especial reputation in its field. The work is excellent of its kind.

HUMAN PHYSIOLOGY. Prepared with Special Reference to Students of Medicine. By Joseph H. Raymond, A. M., M. D., Professor of Physiology and Hygiene, Long Island College Hospital, New York City. Third edition, thoroughly revised. Octavo volume of 687 pages, containing 444 illustrations, some in colors, and four full-page lithographic plates. Philadelphia and London: W. B. Saunders & Company, 1905. Cloth, \$3.50 net.

It is evident that in revising his excellent work for the new third edition, Dr. Raymond spared no labor to bring it up to present-day knowledge. Every page shows evidence of his careful revision, and in that portion devoted to the physiology of nutrition the author has profitably availed himself of Chittenden's valuable contributions to the subject. Besides more fully elaborating many topics previously discussed in the old edition, the author has introduced a number of new subjects, among which are the "Influences of Alcoholic Fluids on the Excretion of Uric Acid," "Hemolysis" and "Bacteriolysis," and "Ovarian and Abdominal Pregnancy." Every one of the 444 figures is practical and illustrates a point which might not be clear to the student. It would be difficult to find another volume of the same size containing so much up to date and accurate information.

TUMORS, INNOCENT AND MALIGNANT—THEIR CLINICAL CHARACTERS AND APPROPRIATE TREATMENT. By J. Bland-Sutton, Surgeon to the Chelsea Hospital for Women, Assistant Surgeon to the Middlesex Hospital, London. Third edition, with 312 engravings. Chicago: W. T. Keener & Company. Price \$4.50.

In this third edition we have the latest revision of a work which has been long regarded as the leading English classic on this subject. The author still embraces the general features of the earlier well known editions, viz., the older general and special knowledge of tumors as they affect different parts of the body. This last edition includes such recent knowledge as that newly developed concerning deciduoma, etc. Primary cancer of the fallopian tube, myelomata and fibroids in their relation to pregnancy, all have detailed attention. One worthy feature of the work is an evident endeavor to correct the hitherto faulty use of scientific terms. Bland-Sutton takes the view that the causes of malignant growths, and it may be said of tumors in general, are practically unknown. Hence he wastes no time or space in discussing them. The work is divided into fifty chapters, contains 556 pages, and is profusely illustrated.

THE DETECTION OF POISONS AND STRONG DRUGS. Wilhelm Autenrieth. Translation by William H. Warren. Philadelphia: P. Blakiston & Co.

Autenrieth's book is too well known to need for this translation of its third edition renewed remarks on its value and merit. For students, physicians and pharmacists it will remain an important source of practical information. It must, however, be said that it can in no way replace our recognized works on toxicology. The translation gives in an admirable perfectness the spirit of the German original, and only insignificant changes have been made. The last chap-

ter is new, and deals with the quantitative determination of certain alkaloids and glucosides in crude drugs (including coffee, tea, etc.). As to the biologic detection of human blood, shortly described, the authors do not emphasize enough that the reaction is one for human proteids only and not specifically for human blood. The method is of secondary importance, and can give reliable results only in the hands of an experienced experimenter.

ENLARGEMENT OF THE PROSTATE. By John B. Deaver, M. D. P. Blakiston's Son and Co., 1012 Walnut St., Philadelphia. 1905.

A feature of this work is the excellent manner in which the illustrations are executed. It is an exceptionally high-class book and contains within its text all there is known about the subject. While the author does not hesitate to express his own opinions and to embody his own individuality, he yet gives much space to the experience of others, drawing largely both in illustrations and text, from the foremost workers in the field of prostatic surgery.

ANATOMY AND PHYSIOLOGY FOR NURSES. By LeRoy Lewis, M. D., Surgeon to and Lecturer on Anatomy and Physiology for Nurses at the Lewis Hospital, Bay City, Michigan. 12mo of 312 pages, with 100 illustrations. Philadelphia and London: W. B. Saunders & Company, 1905. Cloth, \$1.75 net.

Dr. Lewis has based the plan and scope of this excellent little work for nurses on the methods he employs in teaching these subjects. The text is simple and comprehensive, the illustrations well selected. For a work of its size it contains a very large amount of good information.

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